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# ANNALS OF SURGERY

A MONTHLY REVIEW  
OF SURGICAL SCIENCE AND PRACTICE

EDITED BY

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VOLUME V.

JANUARY—JUNE, 1887.

493813

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ST. LOUIS:  
J. H. CHAMBERS & CO.,  
1887.

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# ANNALS OF SURGERY.

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ON NEPHROLITHOTOMY, WITH REPORT OF A  
CASE.

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IN reporting the following case and in shortly discussing some of the chief points in connection with the operation, I do so because the history of nephrolithotomy is of such recent date that every case ought to be published in which the operation is resorted to, and also because the present case is the first in Ireland in which a stone has been encised from the kidney in the living subject. The term "nephrolithotomy" was proposed by Schurigius as far back as the earlier half of the eighteenth century, but the operation itself was performed for the first time by Mr. Henry Morris in 1880, and the details reported by him to the Clinical Society of London in the same year. Mr. Morris defines nephrolithotomy to be "an incision into the secreting substance or pelvis of the kidney, with the express purpose of removing a calculus therefrom; and that too at a date in the progress of the disease prior to the disorganization of the renal substance, or the conversion of the renal pelvis into a large abscess cavity." Although of so recent an origin, the operation has already been performed a sufficient number of times, in England, in America, and on the continent, to show that it is not only a justifiable proceeding, but one fruitful of the best results, and free from risk to an extent hardly to be anticipated.

It is reported that the late Mr. Lawrence used to begin one of his lectures thus: "The kidney, gentlemen, is fortunately beyond the reach of the surgeon."<sup>1</sup>

That day is past, and the kidney has ceased to occupy such

<sup>1</sup>Ashhurst's International Encyclopædia, Vol. V., p. 1090.

a distinguished position. There are four well recognized methods of operative interference with the kidney. (1.) *Nephrotomy*, or simple incision into the kidney, whether for diagnostic purposes, for the opening of an abscess, or for hydronephrosis. (2.) *Nephrorraphy*, designed for the purpose of fixing a movable kidney. (3.) *Nephrolithotomy*, and (4.) *Nephrectomy* or excision of the kidney. I do not purpose in the compass of this paper to discuss the several procedures, but I shall confine myself to that one only which is illustrated by the case which I now desire to report.

J. H., a man, æt. 28, by occupation a silk weaver, was admitted to the Adelaide Hospital in the autumn of 1885, and first came under my care on the 5th of October of the same year, suffering from loss of flesh, increasing debility and pain in the left side. His history was as follows: He had always been healthy till five or six years ago, when his troubles began. He had been in the habit of indulging largely in stimulants, with occasional intermissions, sometimes extending to a period of three months. His drink was invariably ale. In the winter of 1879-80, during one of his drinking bouts, he caught a heavy cold which confined him to bed for a fortnight, with shiverings, fever and pains all over the body. At the end of the fortnight suppression of urine came on and lasted for three days. At the end of this time it was again secreted, and when passed was bloody. For the first day the blood was passed in clots, subsequently it came mixed with the urine, and did not entirely disappear for three months. During this time micturition was not unusually frequent, nor was the act accompanied by pain. There was no vomiting, but the bowels became constipated and sometimes would not act for three days. Concurrently with the hematuria, severe and paroxysmal pain came on. It began in the left groin and hip, and sometimes shot down into the left testicle. When sufficiently well to move about, he noticed that the pain frequently shifted from the testicle to the crest of the ilium and up into the left side near the spine. This pain has continued more or less ever since, but sometimes it is absent for a few days.

Two and a half years later he contracted a gonorrhœa, of which he has not been cured. The passage of a bougie revealed a stricture six inches from the meatus which just allowed a No. 7 English gauge to pass.

For some time previous to his admission to hospital he had been

gradually getting weaker. During the previous week he had been lying up at home unable to eat or drink, and vomiting whatever he took. Previous to this he had had no vomiting. The day after coming into the Adelaide Hospital he was seized with retention of urine, and a catheter had to be passed every day for about a week. At this time he complained of symptoms which suggested vesical calculus, and accordingly he was sounded on two occasions, but nothing abnormal could be detected in the bladder.

His family history was good.

When first he came under my care he was very anæmic. His large dark eyes, with clear bluish conjunctiva, his white lips, and colourless, pasty face was highly suggestive of phthisis. His lungs, however, were sound, and he had no cough. His appetite was fairly good, and when not in pain, he slept well. Whenever he stood or walked the pain in the side came on. It sometimes seized him in the loin, sometimes in the groin or over the iliac crest, but it never shot into the testicle during the whole period that he was under observation. His pulse was 106, and the temperature normal.

The urine he passed contained pus, the amount of this constantly varying. Sometimes it formed but a thin layer at the bottom of the urine glass, and again after twelve hours standing it would occupy nearly a third of the column of fluid. The specific gravity was 1017. The urine was always acid, though sometimes extremely fœtid. The microscope revealed pus cells and crystals of uric acid, but there were no pyriform cells and no tube casts. I was first inclined to look upon the case as one of tubercular pyelitis, as on account of the constant acidity of the urine and the absence of all vesical symptoms, it was evident the pus could not come from the bladder; whilst the cachectic appearance of the man was suggestive of tubercular disease. At my request Dr. Wallace Beatty, on two occasions carefully examined the urinary deposits for bacilli, but none could be detected.

He never passed any calculi or gravel.

I kept him under observation till the 27th of October, when he left hospital, but attended occasionally as an out-patient. He was treated at first with benzoate of soda, which materially diminished the fœtor of the urine, but did little good otherwise. This was subsequently changed for salicylic acid and salicylate of soda with the same result. Astringents of various kinds, including pyrogallie acid, seemed to have no effect.

He was re-admitted to hospital on the 10th of April last, as he was decidedly losing ground, was obviously weaker, and the pain seemed

to be getting worse. The urine had not improved, and pus continued to be passed in large quantities. I now came to the conclusion that the case was one either of purulent pyelitis of the left side or of renal calculus, and that it was a case in which an exploratory operation should be performed. Before, however, resorting to this expedient, I asked my colleague, Dr. Wallace Beatty, to examine the case and to give me his opinion, and I am glad of this opportunity of acknowledging the material assistance and support which he afforded me.

An examination of the abdomen and back revealed nothing abnormal, there was no fulness or tumour or anything. The only thing elicited by this examination was tenderness behind on pressing over the last rib and below the last rib, immediately external to the erector spinæ. There was tenderness nowhere else. The pain was referred to the same region, extending over the lower half of the left side of the thorax, and in the left side of the abdomen below the left costal arch. It was occasionally absent. The pain was described as burning or aching. He could lie with greatest comfort on his back, and better on his left side than on his back. Lying on the right side increased the pain. The character of the urine was the same as when in hospital in October.

From the character and localization of the pain, from the condition of the urine, and from the history of the onset of the disease five or six years previously, Dr. Beatty considered that the weight of evidence was in favour of a renal calculus. Under these circumstances and with the concurrence of my colleagues, I operated on the 6th day of March last, as follows:

The patient was placed under the influence of ether, lying on his right side in a semi-prone position. Pillows were placed beneath the right loin and abdomen, in order to throw the left loin well out and to support the kidney, so that it should not slip forward when reached. An incision was then made parallel to the twelfth rib, three-quarters of an inch below it, and beginning over the external border of the erector spinæ muscle. This incision was five inches long and extended forwards to a point a little superior and posterior to the anterior superior spine of the ilium. The muscles were divided to the full length of the incision and then the lumbar aponeurosis appeared. It bulged out into the incision, and looked so like the colon that for a few moments I was undecided as to its nature. By tracing it backwards, however, I found that it passed behind the kidney, and the doubt being thus removed I divided it freely. The perirenal fat at once came into view, and was carefully torn through by means of fingers and for-



ceps, thus exposing the kidney which looked quite healthy. Passing my finger behind it, I broke down some adhesions, and was then enabled to explore its posterior surface thoroughly. At its inner border my finger impinged upon a hard mass, which at first felt like the spine, but passing the finger downwards its lower limit could be felt. It appeared to be about two and a half to three inches long. An exploring needle was then passed through the substance of the kidney, and as it reached the inside of the pelvis it grated against a calculus. An incision about two inches long was made on the outer border of the kidney down to the pelvis. The hæmorrhage at first was very brisk, but a finger passed through the wound served as a plug, and it quickly became checked. The stone was friable and chalky, but was so firmly imbedded in the pelvis that it had to be crushed with a forceps and removed piecemeal. A large piece occupying the upper portion of the pelvis I succeeded in hooking out with the finger, but most of it was removed with the aid of a lithotomy scoop. The calices of the kidney seemed to contain processes from the stone, and I experienced great difficulty in enucleating them. When I was satisfied that all was clear I irrigated the wound in the kidney with a weak solution of corrosive sublimate to wash out the debris. By this time the bleeding from the substance of the kidney had nearly quite ceased. Accordingly, I plugged the wound lightly with some sal-alembroth gauze wrung out in weak carbolic lotion. A drainage-tube was placed from the deep parts of the wound external to the kidney and brought out at the external angle of the skin wound. All divided tissues were sutured in successive layers with catgut. The wound was dressed with sal-alembroth gauze and a large, thick pad of turf mould was placed over all and the parts firmly bandaged with a flannel roller. During the whole operation, which occupied just an hour, the patient's pulse remained remarkably good. The subsequent progress of the case was most satisfactory.

The external wound healed by first intention, with the exception of the track of the drainage-tube which was not finally closed till between the fourth and fifth week. For the first few days the dressings had to be changed two or three times a day owing to their rapidly becoming saturated with blood-stained urine, but by degrees the dressings became less frequent, and by the fifth week were abandoned altogether. The day after operation I found him lying on his right side, his favorite position since the operation, though previously he could not do so owing to the aggravation of pain which it induced. Mr. Piel, the assistant to the Professor of Chemistry in the College of Surgeons very

kindly analyzed the urine passed day by day *per viam naturalem*. The evening after operation it contained a large quantity of blood, but this rapidly diminished and ceased to appear on the fourth day. On the tenth day the pus was scarcely noticeable in the urine, but since then it has reappeared though in much less quantity. As soon as the external wound had healed he passed a normal quantity of urine daily, and the amount of urea excreted varied from one to two and a half per cent.

The patient has now been back at his work for several months. He has begun to fill out and looks healthy, though still somewhat anæmic. The other day I met him running hastily down some steps very different in appearance to what he was in May last. The pain in the side has completely disappeared. A good deal of the stone was lost in the process of washing away the débris from the pelvis of the kidney, but all that was collected was carefully washed and dried by Mr. Piel, who found that it weighed then 171.3 grains. It is composed of carbonate of lime, phosphate of lime and ammonium magnesium phosphate.

The operation of nephrolithotomy has already obtained a well-established position in surgery. The statistics hitherto have been exceptionally good. Up to the beginning of the present year twenty-two cases were recorded by English and American surgeons. Of these none died as a direct result of the operation. Two died shortly afterwards, one from morphinismus (Pepper) and the other from a calculus becoming impacted in the ureter on the opposite side (Cullingworth). The other twenty cases made good recoveries. In German literature I can only find two cases reported. The first was operated upon by Bardenheuer,<sup>1</sup> but the patient died of anuria, and the autopsy showed that a calculus was impacted in the opposite ureter. The second case was operated upon by Laueinstein in January last and a large calculus removed, the patient making a most satisfactory recovery. It would thus appear that the danger of nephrolithotomy consists more in our uncertainty as to the presence of calculus in the second kidney than to any inherent risks in the operation itself. To obviate this Mr. Knowsley Thornton operated for the removal

<sup>1</sup> Centralblatt f. Chirurgie, 1882, No. 12.



of renal calculus by combined abdominal and lumbar sections in March, 1885, with complete success, but in this I scarcely think he will find many to follow his example, as from the experience afforded by nephrectomy, the abdominal operation is much more risky than the lumbar, and the additional risk incurred by opening the abdomen in addition to the opening in the loin more than compensates for the additional knowledge which may or may not be gained by so doing.

The great difficulty, however, in nephrolithotomy will always consist in the diagnosis. We may fail to recognize the symptoms as renal, as in a case reported elsewhere, where a woman is said to have had both ovaries removed before her troubles were finally dissipated by the extraction of a stone from her kidney. Or we may feel perfectly certain of the existence of a renal calculus, and yet an exploratory incision may fail to reveal it. This has happened already several times, and in one case reported in the Transactions of the Medico-Chirurgical Society for 1885, Mr. Henry Morris, having failed by manipulation and by the help of an exploring needle to detect any stone, excised the kidney and subsequently found a calculus hidden away in one of the calices. He recommends that in future instead of excising an otherwise healthy kidney, a free incision should be made into it, opening up the calices one after another until the stone is found.

The case which I have now reported illustrates the fact that we cannot rely altogether on the classical symptoms of stone in the kidney. The only symptoms which an examination of the various cases hitherto published shows to be present in all these cases are pain radiating from the position of the kidney in the loin, and tenderness on pressure over the kidney. The diagnosis in each case has been helped out by other symptoms; in mine, for instance, by the acidity of the urine and the pus it contained, but none of these are constant except the pain and the tenderness on pressure.

## THE TREATMENT OF THE WOUND AFTER CASTRATION.

By WILLIAM L. AXFORD, M.D.,

OF CHICAGO.

IN cutting operations on the scrotum, such as castration or ablation of the lower portion for varicocele, there is always an unpleasant possibility of a recurrent hæmorrhage, into the causation of which two important factors enter: in the first place the dartos, very vascular and readily contracting under the stimulus of the knife, again relaxes when the patient becomes warm in bed; secondly, the position and relations of the scrotum are such that there is no satisfactory way of compressing and supporting the wound by bandaging.

A rather unpleasant experience with a recurrent hæmorrhage after castration has led to the adoption of a method of wound treatment, for which is claimed security from after hæmorrhage and an increased probability of primary union.

Inasmuch as the case is one of considerable interest a brief report may be acceptable.

R. P., colored, æt. 26. Had both testicles bruised in July, 1882. Pain caused insensibility. Swelling subsided in a few days, and he again resumed his work as a coal-heaver. About six months after he noticed that the left testicle was enlarged and hardened. Tried all sorts of medical treatment. Came under my care at the South Side Dispensary in January, 1884. No history of syphilis. Testicle enlarged and hard. Some fluid in the tunica vaginalis, cord much hypertrophied but not roughened or indurated. Epididymis free from disease. The other testicle was apparently normal. I believed the testicle to be the seat of malignant disease and advised castration. Operation was performed in the usual manner, skin approximated with silk suture, a drainage tube placed in the wound, and an antiseptic dressing applied. I had ligated the cord with silk, en masse. A severe recur-

rent hæmorrhage occurred within an hour and required styptics to control. Even then it was stopped with difficulty. Convalescence, though much retarded by the accident, was uninterrupted. The testicle was the seat of a growth beginning at the centre and involving nearly the entire gland. Microscopical examination proved it a sarcoma.

In October, 1886, he again presented himself with exactly the same condition of affairs in the right testicle, and asked me to operate, saying that he had had no comfort for a year. The testicle had commenced to enlarge two months after the first operation. There was no return of disease in the left groin. Seeing no other way of relieving my patient, on October 18 I again operated, in a small room and under the worst hygienic surroundings imaginable. After shaving and scrubbing the field of operation the usual incision was made, the testicle rapidly enucleated, and the cord transfixed and tied in halves with fine carbolized catgut. After the testicle was cut away one or two bleeding points were secured with the catgut and all oozing controlled by hot water. Beginning at the lower end of the wound, with a small glover's needle armed with No. 9 iron-dyed silk, at intervals of three-fourths of an inch, sutures were passed at right angles to the line of incision so as to traverse the tissues underlying the wound surface and extend completely around and beneath this surface, much the same as in laceration of the perineum. The sutures were visible only at the points of entrance and exit. The wound was closed in this manner up to where the cord lies by the side of the penis where it was found impracticable. A few interrupted sutures from this point upwards and a few superficial sutures between the long sutures completely closed the wound. At the side of the penis a small drainage tube was introduced; gauze, cotton, and a triangle bandage completed the operation. At the end of twenty-four hours the drainage tube was removed and a fresh dressing applied. At the end of six days it was found that primary union had occurred along the entire wound except at a point where two sutures that had been too tightly tied had cut into the wound, causing a small amount of suppuration. There was also some pus along the track of the deep sutures. The patient, contrary to my wishes, had spent a considerable portion of his time out of bed. All sutures were removed and a rest of a week enjoined, though practically the man was well. In again operating I should use aseptic sutures, and had perhaps better state that in an operation in the interval between these two I employed silver wire after this method, but do not like it, as it cuts more than silk and caused great pain on removal. The testicle presented much the same appearance as did the first, the microscope again proving it a sarcoma.

From a pathological standpoint the case is of much interest showing the relation between traumatism and neoplasm, and may be cited in support of the theory that single injuries are much more liable to produce sarcoma, while continued irritation usually results in carcinoma. Exactly why the disease developed so much later in one gland than in the other is problematical. Possibly the disease had started in the second testicle, though at the time of the first operation it could not be detected, the irritation of the styptic serving to incite it to new activity.

In conclusion: to obtain primary union and avoid recurrent hæmorrhage after the operation of castration.

I. Observe strict surgical cleanliness.

II. Ligate the cord with catgut.

III. Put in aseptic sutures as above described, because:

*a.* In the lower and dangerous portion of the wound all oozing will be controlled and drainage will be necessary.

*b.* The wound surfaces will be approximated and supported, primary union favored and recurrent hæmorrhage avoided.

IV. Drainage on the side of the penis alone is necessary.

CASE OF WOUND OF LARGE IRREGULAR VEIN-  
TRUNK IN GROIN DURING ABLATION  
OF GLANDULAR TUMOR, WITH  
CONSECUTIVE GREAT ŒDE-  
MA AND DISABILITY  
OF LIMB.

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THE following case is the one briefly referred to by Dr. L. S. Pilcher, in his memoir on Prophylactic Arterial Ligation, (ANNALS OF SURGERY, February, 1886, p. 114) as case III, it having been communicated to him by Dr. W. Brown-ing. The full description of the case, as subjoined, will show it to have possessed special features of interest that make it worthy of record, in addition to the ligation of the internal saphenous vein, which, as will appear, was not the most important of the trunks ligated. The case is as follows:

*Schoenemann, Wm.*, æt. 29, born in Germany, lithographer by trade and suffering from gonorrhœa, applied for treatment at the German Dispensary, of New York, February, 1881.

He presented himself again March 23, 1881, with an indurated chancre on the inner surface of the prepuce, and by June 18, distinct secondary lesions of syphilis had developed; angina, roseola, stomatitis. July 6, angina still noticeable; considerable enlargement of lymphatic glands in the groin on both sides and acneiform eruption of the face. August 9, inguinal glands much larger; general eruption of small pustular syphilide.

August 10, the patient was admitted to the German Hospital with a papulo-pustular syphilide, general indolent lymphadenitis, an acute, painful swelling of the lymphatic glands in the right groin. After a vigorous course of anti-syphilitic treatment all direct symptoms of syphilis had disappeared by September 20; the buboes on both sides,

however, had not been favorably influenced, but had increased in size with a tendency to acute suppuration; it was, therefore, decided to remove the affected glands by operation.

September 22, the glands of the right side were first removed in the usual manner and without any difficulty. On the left side the tumefied glands formed a swelling fully as large as a hen's egg, approaching the spermatic cord very closely at the upper and inner aspect of the wound. The glands were firmly adherent to the surrounding parts, so that they could not be separated easily with the finger or a blunt instrument; right below the spermatic cord the adhesions were found to be particularly firm, so that it became necessary to detach the glandular mass by means of traction and short clips with a pair of curved scissors, during which manipulation the presence of a large blood-vessel was discovered in close proximity to the thickened capsule of the

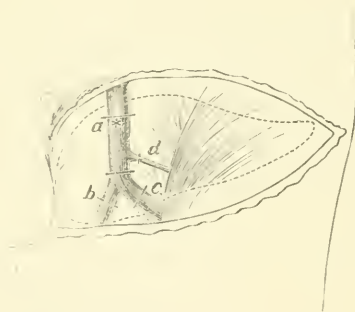


FIG. 1. IRREGULAR LARGE SUPERFICIAL INGUINAL VEIN.

*a.* Large vein formed by:—*b*, Internal saphenous vein: *c*. Irregular muscular branch from outside of thigh, and *d*; circumflex iliac vein.

\* Place of rupture of vein.

..... Dotted line indicating extent of tumor.

— — Ligatures.

gland. While attempting to get clear of this vessel, and probably in consequence of undue traction or manipulation with the closed and blunt scissors, the coat of the blood-vessel gave way and through a rent about 3 millimetres wide an immense quantity of venous blood gushed forth and deluged the field of operation. An attempt to check the flow of blood by means of an artery-forceps failed, owing to the degenerated condition of the walls of the blood-vessel. Direct pressure by means of sponges was then applied, and finally a large rubber



tube adjusted around the thigh about two inches below Poupart's ligament stopped circulation and hæmorrhage effectually. Now the remaining attachments of the glandular mass were quickly severed and the arrangement of the veins was recognized to be as indicated in the accompanying diagram. The inguinal vessel proved to be a large vein formed by the junction of the internal saphenous vein and an irregular vein of large size. The former, instead of piercing the femoral fascia and descending into the femoral vein, continued a superficial course, while the latter emerged from between the fascial layers directly over the femoral artery, the pulsation of which could be plainly seen and felt. From the posterior aspect of the common trunk another vein of medium size could be traced, which was probably the circumflex iliac vein. The common trunk, covered only by the lymphatic glands and the superficial fascia took an upward course, and was lost to view beneath the spermatic cord. It was thought best to apply ligatures not only to the trunk itself but also to the branches near their origin (as indicated in the diagram by the lines across the vessels) and after removal of the rubber tube the arrest of hæmorrhage was found perfect. The wound was now dressed with antiseptic precaution, the extremity showing a slightly bluish color, but no perceptible lowering of temperature, and to avoid any disturbance of the wound the patient was kept in the operating room for several days.

The first change took place September 26 on account of a slight rise of temperature and slight œdema of the limb. The wounds were found to be in good condition; no hæmorrhage, no discoloration. The œdema was less by September 28 and had entirely disappeared by October 16, when the wounds on both sides were found to be healing nicely. October 21, owing to inversion of the edges of the skin, cicatrization was somewhat retarded, otherwise the wounds showed a healthy appearance; the same was observed October 29. On November 4 the wounds were healed so far that they required but a strip of adhesive plaster as a protection. About this time a marked polyuria was observed in the patient without increase of thirst or the presence of sugar in the urine. This symptom had disappeared by November 11, when the patient was allowed to leave the bed. Soon after, however, œdema of the whole extremity developed, distending the limb up to the hip, whenever the patient remained in the upright position any length of time. During the night the swelling would decrease considerably; massage and the rubber bandage had no permanent good effect. At the expiration of about six months the tendency to œdema was still so great that the patient was unfit for any regular work, and

he thought he would be better off without the limb. I had occasion to see the patient once in that condition, but have not met him since. I distinctly remember, however, that after several months I was informed by one of the resident physicians of the hospital that Sch. had been employed there as an assistant porter, and that he had been able to use his leg fairly well. This was confirmed on recent inquiry by the superintendent of the hospital and several other parties employed there. As Sch., however, was at no time upon the list of regular employes of the hospital, I was not able to ascertain the exact time when it happened.

It becomes evident from a glance at the diagram that in the case presented we have an irregular distribution of the veins of the inguinal region, and while there is no question as to the identity of the vena saphena magna, it must remain uncertain whether the severed vessel emerging from the depth, was the femoral vein or only an irregular branch of it, although I am inclined to think that the latter view is the most plausible, and that a femoral vein of reduced size accompanied the femoral artery in its normal situation. As the case stands, especially if we take into consideration the effect on the circulation of the lower extremity, it has to be ranged between ligation of the internal saphenous and ligation of the femoral vein. While the œdema, that was observed during the first week was undoubtedly due directly and solely to the occlusion of the vein, I believe that later on cicatricial contraction and pressure upon the newly established circulation had their share in causing the more permanent and severe swelling. I have observed more or less extended œdema of the limb after extirpation of tumefied lymphatic glands and in cases in which no larger blood-vessels had been injured, the œdema appearing after cicatrization.



TWO CASES OF OPERATION FOR RADICAL CURE  
OF HERNIA, WITH UNUSUAL FEATURES.  
CASE OF CIRRHOSIS OF PE-  
NIS. REMARKS.<sup>1</sup>

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MICHAEL M'GOWAN, Ireland, was admitted into St. Luke's hospital, May 4, 1885, with double inguinal hernia, that upon the left side being much the larger of the two. Twelve years ago, while lifting a child at arm's length, he felt something "give way." There was but little pain, although a small lump was observed in the left groin. A physician whom he consulted pronounced it to be hernia, and directed him to wear a truss, which he did for about two years, after which time, as he experienced no pain or inconvenience and the tumor was very small, he discontinued its use. Three years ago, while lifting a heavy weight, the tumor immediately became much larger, and was attended with sharp pain in the lumbar region, for which he remained in bed for a week or two; since this time he has never been able to hold up the hernial swelling with any truss which he could procure.

Eight years ago he came violently in contact with a "sharp corner," and a small bubonocoele appeared in the right groin. This gave him no trouble until he lifted the heavy weight three years ago, after which time both his herniæ became larger and painful. For the year or two past he has grown very fleshy. Summing up, this is his condition on admission to hospital, viz: On the left side is a large, indirect inguinal hernia easily reduced, except a small knuckle of intestine apparently adherent to the sac. The pillars of the ring are readily defined and very much spread, easily admitting four fingers. On coughing or straining, a large mass of intestine comes down, measuring three to six inches.

<sup>1</sup> Read before the New York Surgical Society, November 6, 1886.

The inguinal ring upon the right side easily admits two fingers, and the edges are sharply defined. On coughing, only a small bubonocoele comes down.

Family history and general condition good, except that he had been drinking freely of spirits for some time.

As he suffered so much from the size of the tumor, and the fact that he could not wear a truss, I determined, after consultation with my colleagues, to perform Banks's operation for the radical cure of the hernia in the left groin.

On May 7th the patient was put upon the table for operation, and with much delay brought under the influence of ether. During almost the entire time of the inhalation he vomited, coughed, and struggled, so that it made the operation one of great difficulty.

A free incision was made through the skin, commencing just above the level of the external abdominal ring, and the dissection carried carefully down, layer by layer, until the sac was exposed and the pillars of the ring were brought distinctly into view. The ring was very large and patulous, easily admitting four fingers. The hernia was now reduced by gentle taxis, leaving the collapsed sac in the wound. The cord was found behind and well out of the way. The sac was now opened and a knuckle of gut was found closely adherent to its wall just at a level with the ring. It was not deemed prudent to attempt its separation, and it was left as found. The opening in the sac was now carefully and with much difficulty stitched to the pillars through and through with stout catgut, and the ring closed.

Owing to the restlessness of the patient under ether and frequent attacks of vomiting, the bowels were forced down in a large mass and spread out upon the outside of the belly.

The protruding bowel was carefully guarded with towels and sponges wet with hot water. This stage of the operation was exceedingly difficult and prolonged. It was, however, finally accomplished. A great portion of the sac was now dissected out, two bone drainage-tubes were introduced, and the wound was closed with carbolized catgut and an antiseptic dressing placed over all. During the escape of the bowel the pulse sank very low, and he suffered very much from shock, but was finally restored by brandy, ether, and digitalis hypodermically administered.

The patient suffered very much from nausea, pain, and tympanites for a few days after the operation; but these symptoms gradually subsided. The wound did not heal throughout its whole extent by first intention, but remained open at the two angles, gradually filling up with granulations until June 17, 1885, when he was discharged cured.

Alice Surminski, Ireland, æt. 50, married, was admitted into St. Luke's Hospital, January 22, 1886. Six years ago, after lifting a heavy weight, she noticed a small lump in the right groin. Finding that it did not disappear after a few days, she entered Roosevelt Hospital, where she was treated for a short time, but no operation was done. Ever since that time she has felt a weakness in the right groin, and on exertion a tumor would appear, which could be reduced. She has never worn a truss.

Ten days ago, after a severe strain, the tumor appeared, was painful, and increased in size. The bowels were constipated, and she suffered somewhat from nausea. On admission, examination revealed a tumor in the right groin below the inner third of Poupart's ligament, globular in shape, about one inch in diameter, elastic to the feel, slightly painful on pressure, and dull on percussion.

A portion resembling a pedicle extended down toward the femoral canal. Before admission attempts had been made to reduce it by taxis, but without success. The attempt was renewed after admission with no result, except to occasion local inflammation and considerable pain. She was ordered strict decubitus and the cold coil was applied.

The tumor was considered to be an incarcerated femoral hernia; contents chiefly omentum, and after consultation I determined to perform Banks's operation, hoping to make a radical cure.

On February 5, 1886, she was put on the table, ether was administered, and she was quickly brought under its influence. The integument of the groin and neighborhood was shaved, scrubbed and rendered aseptic. An incision about two inches long was made over the convexity of the tumor and the dissection was carefully made down toward the sac. The connective tissues in this neighborhood were matted together, thickened, and extensively adherent to the sac itself. These adhesions were carefully dissected away and the sac was opened, allowing the escape of some yellowish fluid. When brought into view, the contents of the hernial sac were found to be a sheet of omentum enveloping about three inches of the vermiform appendix, the distal portion of which was doubled upon itself, allowing the knuckle thus formed to project above the omentum, resembling a gland, for which it was indeed mistaken until the unraveling of the tissues determined its true character. The contents were adherent to the sac, but were dissected free, and the vermiform appendix and omentum were separated down to the ring, where each was separately ligated with stout catgut and cut off. The portion of the appendix vermiformis removed was two inches and a half long, and of about the size of a goose-quill. The

sac was now tied off, and, with the stump which was left just at the femoral ring, was stitched through and through with catgut. A rubber drainage-tube was now inserted to the bottom of the wound and the skin closed over with fine catgut suture. During the operation the wound was frequently irrigated with a solution of bichloride of mercury, 1 to 1,000. The dressing was iodoform gauze and a spica bandage.

The first dressing was not disturbed until February 10th, when the drainage-tube was removed, there being perfect union, except where the tube emerged. During the progress of the cure a small collection of pus occurred which somewhat delayed the healing.

She was discharged cured March 9, 1886.

Early in May, 1883, a gentleman, Mr. S, æt. 65, presented himself with a condition of the penis to which I had never seen a parallel. For more than two years past he had complained of pain in that organ, and changes in structure had taken place which occasioned him much mental worry, and made him decidedly hypochondriacal.

On examination, I found the glans and body of the penis, for about an inch from the end, hard and unyielding to the touch. The prepuce was very hard to the feel, inelastic, and embracing the glans very closely; it could not be drawn back sufficiently to expose it. The portion of the glans penis which could be exposed had the same hard feel, and was mottled with two or three small, red, smooth spots not ulcerated. Pain, although not severe, had been a constant symptom. There was also much itching and burning.

His general health had been considerably affected, but apparently more from mental agitation than from actual disease. The organ was not increased in size. There was no syphilitic or glandular taint.

Fearing that, if left unaided, it might degenerate into epithelioma, I determined to amputate the penis, which was done May 9, 1883.

The operation was done about one quarter of the distance behind the corona glandis with a circular sweep of the knife. The urethra was then dissected out, drawn forward, and stitched with fine sutures to the skin, in order to prevent retraction. The wound healed very kindly, and he returned to his home in the country, May 22d, thirteen days after the operation.

The specimen was handed to Dr. Frank Ferguson, pathologist, who made the following report:

"Examination of the penis from amputation by Dr. George A. Peters, on May 9, 1883.

"The organ was amputated just behind the corona glandis, the pre-

puce being also removed. The meatus is small, admitting only a No. 15 French sound, and the tissues around it are anæmic and of a peculiar transparent color. The urethra behind the meatus bears the normal relation to a penis of this size. The mucous membrane covering the glans and inner surface of the prepuce is normal. There is a zone of inflammation products in the prepuce and glans throughout their entire extent, and, although generally a considerable distance from the surface (in the glans along the periphery of the corpus cavernosum), in places there extend from the inflammatory zone limited areas which reach the mucous surface. This zone is composed of small round cells (young cells); in places accumulations of considerable size are seen, as in the formation of abscesses, but nowhere is seen any tendency to break down. Some of the blood-vessels in the neighborhood of this zone of young cells are filled with similar small round cells, while the vessels which pass up through the diseased parts to the mucous membrane are empty. The vessels of the corpora cavernosa are generally distended with blood.

“*Diagnosis.*—Inflammation of the submucous tissue of the glans penis and prepuce.

“*Note.*—1. The inflammation is extensive, its products found at the line of incision in the amputation.

“2. There are no epithelial cells found in the glans or prepuce beneath the mucous membrane, nor anything indicating carcinoma or sarcoma.

“3. There has been general pressure on the vessels and nerves by the inflammatory products.”

On presenting these two cases of operation for the radical cure of hernia, I desire to call attention to complications occurring in both of them. In the case of McGowan, who took ether badly, on opening the sac, a large mass of intestines was forced, by his efforts to vomit, through the distended and flabby ring, and was a source of much embarrassment and considerable danger until it was returned to its home. The principal assistant should guard very carefully the open ring and head off the first attempt at escape. The danger from shock will be much lessened if the truant gut is kept carefully protected by hot wet sponges.

In the case of femoral hernia, a complication presented—namely, the appendix vermiformis—which I do not remember

to have seen in any hernial sac which I have opened. In this case it was, when first seen, supposed to be a gland, but as the mass was unrolled its identity was established. As the hernial mass was adherent to the neck of the sac, it was determined to ligate the entire protrusion so that it might act as a plug. On examining the appendix after its removal, it was found to be pervious down to the very tip, but contained no fæcal matter. The wound of operation healed kindly, and the presence of the divided appendix seemed in no way to retard the cure.

Of all the methods which have been adopted for the radical cure of hernia, the one described above and introduced to the notice of the profession by Banks, of Liverpool, is the most rational to the student and captivating to the surgeon.

The experience which most of us have had with the operation of Heaton by injection and with the needles and wire has not, I will venture to say, been so satisfactory as to convince us that nothing better can be devised.

The methods of procedure adopted vary according to the theories or experience of different surgeons. Some use the silver wire, others aseptic silk thread, and others again carbolized catgut. The result of my experience and observation inclines me to advocate the catgut properly prepared so that it will not dissolve too readily.

Union by first intention in the wound is not so desirable as might at first seem. A sufficient amount of inflammation to procure a dense thickened mass of tissue, provided this is the result of suppuration and granulation about the ring and canal, is to be preferred.

That the operation is a reasonably safe one is, I think, proved by the results already obtained. When the cases are properly selected and the operation is done with all modern precautions, the percentage of recoveries is as large as in the cases reported by Banks and others abroad. Even when such precautions are not observed, the statistics show a death-rate of only one in eight.

In cases where the hernia is large and subjects its owner to much pain and discomfort, where it can not be entirely re-



turned or, if returned, can not be kept in place with a truss, this operation is indicated. Even if it should not result in a perfect cure, the patient will be so much improved as to be able to wear a truss with comfort and become again a breadwinner.

The case recorded above in which I resorted to amputation of the penis is unique in my experience. Dr. Ferguson also states that it is the first of the kind which has been brought to his notice. The operation is to my mind justified by the fact that Mr. S. is now in good health, and there has been no extension of the disease. The relief to his mental condition would in itself sanction the operation.



## EDITORIAL ARTICLES.

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### THE SURGICAL TREATMENT OF PERITONITIS.

An important monograph upon the surgical treatment of peritonitis by Dr. H. Truc, of Lyons,<sup>1</sup> has recently appeared. Its scope is more extensive than that of the memoir of Mikulicz,<sup>2</sup> already reviewed in these pages,<sup>3</sup> for it includes a study of almost every variety of peritonitis, collecting the many facts scattered through the current periodicals.

It is written from an unusual standpoint, the author believing that in any case the peritonitis is the principal indication for treatment; if, in developing our therapeutic attack, we find the cause of the peritonitis still existent, we should treat that also.

Truc rejects the division of purulent peritonitis into septic and aseptic; "purulent peritonitis is more septic or less septic, but it does not appear to be sometimes septic, sometimes aseptic." Both clinical and experimental studies support this view, giving a graduated series, puerperal peritonitis and the forms due to fecal extravasation being the most septic of all.

*Simple peritonitis without effusion*, showing pathologically only a congestion of the membrane, does not encourage surgical interference. Knowsley Thornton, who has operated twice in this condition without success, holds that the operation will be justifiable only when we can by it in some way diminish the peritoneal congestion.<sup>4</sup>

The fatality of *purulent peritonitis* is too well known to need the repetition here of Kaiser's<sup>5</sup> statistics. These cases were formerly

<sup>1</sup>"Traitement chirurgicale de la péritonite." Thèse de conc. pour l'agrégation, Paris, 1886.

<sup>2</sup>Volkmann's Samml. klin. Vorträge, No. 262.

<sup>3</sup>Ann. Surg., May, 1886, p. 386.

<sup>4</sup>Brit. Med. Jour., 1885, I., 538.

<sup>5</sup>Deutsche Arch. f. klin. Med., 1876, XVII., 74.

treated by puncture or incision when they pointed as abscesses. Dissatisfied with the results thus obtained, the modern surgeon prefers laparotomy, and eight successful cases of this operation for general simple peritonitis are already on record—those of Tait,<sup>1</sup> Elias,<sup>2</sup> Studensky,<sup>3</sup> Krönlein,<sup>4</sup> Bertels,<sup>5</sup> of St. Petersburg), Caselli,<sup>6</sup> Schmidt (Centralbl. f. Chirurgie, 1882, p. 772) and Valerani (ibid, 1886, p. 269), unless the last is to be considered a local peritonitis. Against these are to be placed three failures—the cases of Morratt Baker,<sup>7</sup> Samuel West,<sup>8</sup> and Wade,<sup>9</sup> in all of which the operation was undertaken with the patient in collapse and death occurred within twenty-four hours. As Truc remarks, these statistics are too incomplete and the totals too small to be of any value; but a careful study of the successful cases shows that immediate improvement followed the operation, while the result could hardly have been other than fatal had the disease been left to its natural course. Truc formulates his conclusions thus: Suppuration in the peritoneal cavity should be treated like suppuration in the pleural or articular cavities; the results will correspond to the promptness and thoroughness of the treatment; and laparotomy is the best treatment, for it allows thorough evacuation of the pus, careful cleansing of the cavity, the destruction of adhesions (which may encapsule small collections of pus); the removal of exudation and perfect drainage. Laparotomy, moreover, allows thorough examination of the whole abdomen and may result in the discovery and removal of the cause of the inflammation.

In studying *puerperal peritonitis* we must first exclude the hyperacute form which terminates life in two or three days, or even in a few hours, for this form is merely a local manifestation of a severe general septic infection, and allows of no treatment. Fortunately, in most

<sup>1</sup>Brit. Med. Jour., 1883, I., 304.

<sup>2</sup>Rev. des sciences méd. (Hayem) 1882, II., 682.

<sup>3</sup>Centralbl. f. Chir., 1886, p. 172.

<sup>4</sup>Arch. f. klin. Chir., 1886, XXXIII., 518.

<sup>5</sup>Quoted by Dupaquier. Th. de Paris, 1885, No. 233.

<sup>6</sup>Lemaine médicale, 28 avril, 1886, p. 179.

<sup>7</sup>Lancet, 1885, II., 950.

<sup>8</sup>Ibid.

<sup>9</sup>Lancet, 1886, I., 343.

cases of puerperal peritonitis the peritoneum becomes first affected and there is time to remove the dangerous material before absorption and general systemic infection occur. Truc divides the modern treatment of puerperal peritonitis into three varieties—prophylactic, palliative and curative. The first has accomplished wonders, and puerperal peritonitis is now an uncommon disease. The palliative treatment, however, is of little importance; and curative, that is, surgical treatment, gains ground daily in the favor of the profession. He finds two indications for treatment—excessive tympanites and effusion into the peritoneal cavity.

Depaul<sup>1</sup> first successfully treated tympanites by capillary punctures and his case entirely recovered. The experience of surgeons with this method has not been encouraging, for the relief has been only temporary. We would add that it is also a question whether capillary punctures, no matter how carefully the operation is done, is so free from danger as Truc and the other advocates of the method would have us believe. An extraordinary case, showing the great advantages to be gained by relieving the tympanites in some cases, is that reported by Reibel,<sup>2</sup> of which we give a summary, as the original account is not easy of access: A girl, *æt.* 8, was attacked by general peritonitis, and death seemed at hand, when on the 19th day of her illness, Reibel performed median laparotomy, but found neither pus nor gas in the peritoneal cavity. The intestines were adherent and an accidental wound was made in the gut, from which issued fetid gas and fecal matter. The wound was dressed, but not sutured. The next day improvement was manifest, and a stool occurred. Slow recovery took place. As Truc remarks, this was a happy chance, and the case teaches nothing except the improvement obtained by providing for a permanent escape for the gas.

In this connection the following rare case (of which we were witness, and which we publish by the kind permission of the operators) is of great interest: July 30, 1884, Dr. T. Gaillard Thomas, assisted by Dr. James B. Hunter, performed laparotomy upon a woman, *æt.* 35,

<sup>1</sup>Gaz. hôp., Paris, 1871, p. 335.

<sup>2</sup>Gaz. méd. de Strasburg, 1883, p. 2—quoted by Truc, p. 75.

for a fibro-cyst of the uterus. The cyst was incised, the edges of the opening sewed to those of the abdominal wound, and a glass drainage-tube inserted in the cyst cavity. Careful toilet of the peritoneum was made, the rest of the abdominal wound closed without drainage, and a light antiseptic dressing applied. Dr. Hunter then took charge of the case. The cyst cavity was irrigated daily, and rapidly contracted. The temperature,  $103\frac{1}{2}^{\circ}$  at first, fell to normal by August 7; the pulse remaining throughout at 110 to 120. Some tympanites existed from the beginning, but on August 10, after a sudden movement by the patient, it began to increase rapidly. Great dyspnœa and cyanosis came on, and early on August 12 the patient lay at the point of death, making only four gasping respirations per minute. Dr. Hunter then inserted the small needle of an aspirator in the median line above the umbilicus and gave issue to a strong jet of *odorless* gas, which lasted for an hour, reducing the enormously distended abdomen to normal dimensions. Very fetid flatus was soon after passed per anum. The tympanites did not return, and speedy convalescence followed. It seems almost certain that the gas in this case was contained in the peritoneal cavity and not in the intestines.

The second indication, the removal of the peritoneal effusion, may be met by simple puncture when the fluid is serous, but more energetic methods are needed when it is sanious or purulent. Truc has collected eight cases of the purulent form treated by puncture or small incision; one case of evacuation by the bistoury through Douglas' cul-de-sac, and five cases of laparotomy—those of Bojie,<sup>1</sup> Kaltenbach,<sup>2</sup> Playfair,<sup>3</sup> Molokendoff,<sup>4</sup> and Sonnenburg.<sup>5</sup> Sonnenburg's case can only be included by a little forcing, as the operation was done for a general peritonitis set up by a puerperal perimetritic exudation. Only one death occurred in all fourteen cases—Molokendoff's, and it seemed to be due to carbolic acid poisoning. Truc then relates the histories of two hitherto unpublished cases of laparotomy for septic puerperal

<sup>1</sup>Schmidt's Jahrb., 1877, CLXXV., p. 173.

<sup>2</sup>Gynécologie opératoire, 1885, p. 412.

<sup>3</sup>Brit. Med. Jour., 1883, I., 455.

<sup>4</sup>Rev. de sciences med. (Hayem), 1883, II., 266.

<sup>5</sup>Arch. Tocologie, 1885, p. 381.

peritonitis done by Bouilly at a more acute stage in the malady than any yet recorded.

The patients developed peritonitis on the second day after normal labors. In spite of the use of intra-uterine douches the patients grew worse, and laparotomy was done on the fifth and sixth days (respectively) after their confinement. The peritoneal cavity contained in one case some "yellowish, viscous" fluid, and in the other a large amount of sero-purulent fluid, and in both cases was irrigated with a weak bichloride of mercury solution. Death occurred in one case in fifteen hours after the operation, and in the other in three hours.

Bouilly thinks that his operations were practiced too late. He holds that one should not wait for the formation of peritoneal effusion, or for high fever, but act as soon as tympanites, great iliac or pelvic pain, and a marked systemic reaction are observed, only bearing in mind that the first two symptoms are uncertain and may disappear spontaneously. We venture to suggest that in this difficult situation an important indication as to our action would be furnished by the effect produced by the intra-uterine douche. If its effect is decidedly beneficial, laparotomy would be unnecessary; but if little or no improvement is noticed during the use of the douche for twenty-four hours, it would be evident that disaster was impending, and laparotomy must be resorted to as a forlorn hope.

It seems to us, moreover, that this very treatment of puerperal septicæmia by intra-uterine injection furnishes the strongest argument by analogy in favor of laparotomy and peritoneal irrigation in puerperal peritonitis. We are clinically familiar with the wonderful effects often produced by these douches, and in spite of the risk which attends them, they are now universally employed. Why are we not justified in assuming in severer cases the greater risk of applying similar treatment to the peritoneal cavity? We agree that it is necessary to remove from the uterine cavity all material which may by its presence there add to the septic infection already existing—whether we believe that material to contain infecting micro-organisms and the soil they flourish in, or hold some more intricate theory of septic infection. At all events, it has been demonstrated that the peritoneal effusion contains

the same micro-organisms and other constituents which are found in the uterine contents, and the conclusion logically follows that the peritoneal effusion should also be removed, or at least exposed to the action of the chemicals used in antiseptic injections. This seems to us a far closer analogy than the one suggested by Truc—the curetting of the axilla in cases of septic lymphangitis originating in the finger.

Passing to the peritonitis caused by *non-traumatic perforation* of the stomach and intestine, we find in this memoir three cases hitherto unpublished: Robert—peritoneal abscess, near umbilicus, puncture and drainage, recovery; Reynier—symptoms of intestinal obstruction for five days, laparotomy, purulent peritonitis, but no obstruction found, death in seven hours, autopsy showed perforation of cœcum; A. Poncet—case identical with last, except that the autopsy showed gangrene of the vermiform appendix without any recognizable perforation. Confining ourselves to the cases treated by laparotomy, we find that Truc has collected three besides the above—the case of Chapnut and LeFort,<sup>1</sup> and the two of Krönlein.<sup>2</sup> To these should be added the cases of Polaillon<sup>3</sup> and Mikulicz,<sup>4</sup> making a total of seven. In five of these cases the operation was done under the diagnosis of intestinal obstruction. In four the perforation was not found during the operation. In all seven the operation was performed after a delay of from three to ten days, and too late to be of service, unless we hold that some might have been saved if the perforation had been found. But it is this very delay which renders the proper examination of the abdominal contents so difficult. Certainly, if there is anything to be learned from these cases, it is the fact that intervention, to be useful, must be undertaken early. Truc counsels against laparotomy in cases of typhoid, dysenteric and tuberculous ulcers, on account of the feeble condition of the patient usually found in these maladies, but the attitude of Mikulicz appears to us the correct one—to operate in every case of perforative peritonitis, if the patient is not already in a state of

<sup>1</sup>Progrès méd., 1883, p. 103.

<sup>2</sup>Arch. f. Klin. chir., 1886, XXXIII., 514-522.

<sup>3</sup>L'Union méd., 1884, XXXVII., p. 14.

<sup>4</sup>Samml. kl. Vorträge, No. 262, p. 2313.



collapse, and at an earlier date than has as yet been the custom.

In peritonitis from the *rupture of abscesses* into the peritoneal cavity Truc quotes the successful cases of Tait,<sup>1</sup> Treves,<sup>2</sup> and Israël,<sup>3</sup> and we might add to them the case of Burchard<sup>4</sup> (although in it the rupture took place just as the abscess was incised, and laparotomy was done at once), all showing that laparotomy and thorough cleansing of the peritoneum can save the patient.

Rupture of ovarian cysts and of the foetal cyst in extra-uterine pregnancy demand immediate laparotomy, but if delay occurs and peritonitis develops, it is no contraindication to the operation.

Of peritonitis with strangulated hernia Truc has found two cases treated by herniotomy and drainage—Horsley's,<sup>5</sup> local peritonitis, recovery; and Godlee's,<sup>6</sup> general, death. He gives three cases treated by laparotomy by Ceci,<sup>7</sup> Israël,<sup>8</sup> and Oberst;<sup>9</sup> to which we would add those of Desnos,<sup>10</sup> Fitzgerald,<sup>11</sup> and Hall<sup>12</sup>—six in all, if we admit Israël's case. In all, the abdomen was opened by extending the incision for herniotomy. In Israël's case the peritonitis was caused by a perityphlitis, strangulated hernia complicating—recovery. Desnos' and Ceci's cases had perforation of the small intestine, not discovered until autopsy. Oberst found perforation of the small intestine, and made an artificial anus—death. Fitzgerald found and sutured a perforation—death. Hall found perforation of the vermiform appendix; and resected the latter—recovery. Although only Israël and Hall saved their patients, we may safely deduce from these cases (with Truc) the necessity for an exploration of the abdomen whenever, in

<sup>1</sup>Brit. Med. Jour., 1883, I., p. 303.

<sup>2</sup>Lancet, 1885, I., 475.

<sup>3</sup>Semaine méd., 1884, p. 159.

<sup>4</sup>N. Y. Med. Jour., 1885, II., 173.

<sup>5</sup>Med. Times, Lond., 1885, II., 431.

<sup>6</sup>Med. Times, Lond., 1885, I., 678.

<sup>7</sup>Gaz. med. di Roma, 1883, No. 17, 193.

<sup>8</sup>Semaine médicale, 1884, 159.

<sup>9</sup>Centralblatt f. Chirurgie, 1885, 345.

<sup>10</sup>Bul. Soc. Anat. de Paris, 1879, LIV., 571

<sup>11</sup>Australian Med. Jour., 1883, V., 264.

<sup>12</sup>N. Y. Med. Jour., 1886, I., 662.



the operation of herniotomy, that cavity is found to contain purulent or septic fluid. This may be done by enlarging the incision upwards, or by median laparotomy. The case of Oberst, in which death seemed to be due partly to innutrition on account of the artificial anus, partly to the existence of many small collections of pus encysted between the folds of the peritoneum, emphasizes the necessity of thorough exploration of the abdomen, which can only be carried out by median laparotomy. But if haste is necessary, as in Hall's case, his example might be followed, and the adhesions broken down by the hand introduced upwards through the incision in the iliac region.

It is fortunate that the results of laparotomy for *intestinal obstruction* are so satisfactory, considering the impossibility of distinguishing it from perforation of the intestine, for one can operate at once with the knowledge that the treatment is suitable to either condition, and is, moreover, curative for a peritonitis dependent upon intestinal obstruction. Even septic peritonitis is not a contraindication. In laparotomy for intestinal obstruction, a careful toilet of the peritoneum is necessary, but drainage may usually be dispensed with.

In *perityphlitis* Truc favors early operation (as soon as pus can be detected), but not so early as is urged by Bull,<sup>1</sup> Fitz,<sup>2</sup> and others. The modern tendency seems to be in the direction of explorative operation—even laparotomy, without waiting to discover pus. The inroads of Tait's operation upon the old theories of *pelvic peritonitis* have thrown the pathology of that affection into such an uncertain state as to make it impossible to reach any satisfactory conclusions at present, and omitting Truc's views upon it, we will give his deductions from a study of *localized peritonitis* in general. They are briefly these: (1). Serous or hemorrhagic cysts require treatment only when they are of large size or when their contents become purulent. (2). Purulent encysted peritonitis demands prompt evacuation of the pus, the smaller cysts adherent to accessible parts of the abdominal wall being treated by simple incision; those not so placed, the large collections and all

<sup>1</sup>N. Y. Med. Record, 1886, I., 265 (and discussion, 285).

<sup>2</sup>Am. Jour. Med. Sciences. 1886, II., 321.

cases in which the diagnosis is uncertain being treated by laparotomy. (3). Tendency to external spontaneous opening should hasten the operation; but if discharge takes place into any of the hollow organs, the surgeon may wait, holding himself ready to operate at once in case of retention of pus, functional disturbance of any kind, or deterioration of the general condition of the patient. This last conclusion admits of some criticism, for in most cases of such internal opening, the danger of septic infection is so great that one would not be disposed to blame the surgeon who should make an external incision at once.

In *peritonitis after surgical operations* upon the abdomen, the admitted treatment is to at once supply free issue to septic or purulent collections by drainage and irrigation, thus removing all danger of general infection. But Terillon<sup>1</sup> has shown (and we might in this connection also refer to Engelmann's paper on "Insidious Septicæmia")<sup>2</sup> that this peritonitis often develops with obscure symptoms—vomiting, pain and even anxiety being frequently absent; tympanites is the most constant symptom. This obscure form of peritonitis, however, a form without any effusion into the cavity, does not yield to any treatment, and its recognition is as yet of no practical importance, for the surgeon is powerless against it.

Truc's study of traumatic peritonitis caused by wound or rupture of stomach or intestine is not very satisfactory. His list of cases is far from complete, and he (and Mikulicz also) does not at all consider the question of explorative laparotomy. He says of these cases: "When, in the absence of an external wound, the diagnosis is uncertain, medical treatment is alone suitable," admitting surgical intervention only when the doubt has been removed by the development of peritonitis. In many cases of simple contusion of the abdomen without visceral injury, the symptoms are as severe at first as in the cases with rupture of the stomach or intestines, and the diagnosis is impossible until peritonitis develops. Even the loss or persistence of dulness on percussion over the liver is not a thoroughly reliable sign. In penetrating gun-shot and pistol-shot wounds of the abdomen the successful cases

<sup>1</sup>Bull. therap., 1883, CIV., p. 175.

<sup>2</sup>Trans. Am. Gynecol. Soc., 1884, p. 259.

already on record show that the surgeon is justified in performing laparotomy before peritonitis sets in, for he may be confident that he will find a wound of the stomach or intestines in almost every case. The only contra-indication would be the probable existence of a wound of the liver with severe hemorrhage.

It is true that the successful cases of Bouilly<sup>1</sup> and Mikulicz<sup>2</sup> (as well as the non-traumatic cases of Krönlein, Hall and others, already given), prove that peritonitis with fecal extravasation may be successfully treated by laparotomy. But this is so much the exception that it seems to us to be one of the tasks of modern surgery to give explorative laparotomy a trial in certain cases of contusion of the abdomen, in order to gain for these cases also the advantages found in performing laparotomy for gun-shot wounds of the abdomen before peritonitis has developed.

Dennis,<sup>3</sup> indeed, would apply the principle of exploring the abdomen to every injury in which it was probable that intestine or stomach had been wounded. He performed explorative laparotomy in one case of penetrating stab-wound of the abdomen, without finding any injury of the viscera, and his patient made an excellent recovery, thus giving the theory the support of one case to show that the operation does not necessarily endanger life.

Truc is an earnest advocate of explorative laparotomy, however, in cases of purulent peritonitis, and we may fittingly close with his own words: "The opening of the abdomen has lost much of its gravity, and we believe that we have demonstrated that certain forms of peritonitis can be cured by opportune and methodical surgical treatment; that is enough to condemn systematic refusal to operate. \* \* \* Instead of continuing to be a contra-indication, it (peritonitis) should become a positive indication. Death, in the cases of which we speak, is certain. We have seen that the operation may save the patient. Why hesitate to give the latter some chance of recovery?"

B. FARQUHAR CURTIS.

<sup>1</sup>Bull. Soc. de Chir., Paris, 1883, IX., 698.

<sup>2</sup>Samml. klin. Vorträge, No. 262, p. 2315.

<sup>3</sup>Med. News, Phil., 1886, I., 225, 253.

## KUEMMELL ON HIGH-LYING STRICTURES OF THE RECTUM.

A paper on this subject recently read before the Hamburg Medical Society<sup>1</sup> by Dr. Hermann Kümmell will be found interesting and instructive, as the subject deserves more attention than is usually accorded it. Under the term "high-lying strictures of the rectum" the author does not mean, generally speaking, all strictures of the upper portion of the rectum caused by the pressure of intra-pelvic growths or inflammatory products, or brought about by displacement or adhesion of the rectum to other organs, nor stenoses resulting from malignant or benignant neoplasms. On the contrary, the term is applicable only to a certain group of cicatricial strictures caused by ulcerative processes consequent to chronic infectious diseases.

Strictures situated lower down in the rectum are, as a rule, easy of diagnosis by means of simple digital exploration. In this respect those lying higher up differ greatly, not being accessible to the same means of examination. The author includes also among these latter strictures those found in the sigmoid flexure. The lowest boundary for these high-lying strictures should be placed at about 12 ctm. above the anal opening, the uppermost at about 35 ctm., which would correspond to the junction with the descending colon (counting 15 ctm. for the rectum and 20 ctm. for the sigmoid). Perret collected 60 cases of strictures, examined in the cadaver, and it is interesting to note the relatively small number of high-lying strictures among the number. In 4 cases the strictures originated in the anus, in 32 cases below 6 ctm., in 3 cases at about 6 ctm., in 7 between 6-9 ctm., in 5 cases over 9 ctm. above the anus, and in 6 cases the point of union of rectum and colon was the seat of trouble. In 4 cases several strictures were found.

Two chronic infectious diseases, namely, dysentery and syphilis, are the chief causes, etiologically speaking, for this trouble; catarrhal ulcerative processes the more seldom. But in rare instances tuberculous processes may give rise to strictures of this kind, as demonstrated by the author in a very interesting case.

<sup>1</sup>Volkmann's collection of clinical lectures, No. 285. (Chirurgie, No. 88).

The patient was a man, æt. 25, in whom the symptoms of a disease of the rectum developed consecutive to an obstinate catarrhal inflammation of the intestines. Heart and lungs were normal, but on exploration of the rectum with the hand, a stricture about 14 ctm. above the anus was discovered. The flat tumor-like mass causing the stricture, involved about two-thirds of the circumference of the intestine and was adherent to the sacrum. Patient was placed under anti-syphilitic treatment and dilatation of the stricture begun by means of bougies. Improvement was steady for some three months, when he began to complain of increasing pain in the loins. A deep-lying, visibly-fluctuating abscess on both sides of the sacrum was discovered and incised, releasing a large quantity of purulent matter. Nearly the whole of the posterior and the lower part of the anterior surface of the sacrum was carious. Patient became rapidly weaker, symptoms of general tuberculosis appearing. Death fifteen months after commencement of the rectal disease. In the autopsy the stricture was found almost completely dilated. The cavity of the sacrum was covered with firm cicatrices and numerous tuberculous ulcers, the intestines being firmly adherent to the same.

It is not always easy, but for therapeutic purposes of much importance, to determine which of the two mentioned diseases is the causative element in these cases. The author, for instance, reports two cases where the patients who had in former years both contracted syphilis, resided for many years in the tropics. Each of them suffered then from repeated attacks of intestinal catarrh, but never with dysentery. Nothing resulted from anti-syphilitic treatment, and thus nothing was gained from an etiological point of view. The relatively small number of high-lying strictures, however, found, in more northern countries, in consequence of the infrequent and less malignant occurrence of dysentery, on the one hand, on the other the fact that almost without exception the afflicted persons have resided for long periods in the tropics and attribute the commencement of their illness to their residence there, and finally, the positive observations concerning the development of this trouble, directly following an attack of dysentery, would sufficiently prove that the latter disease is the principal causative influence for this form of stricture.

In most cases, says the author, the autopsy will shed no light on the primary cause of the trouble. Above the stricture the intestine is usually much distended from stagnation of fecal matter. In consequence of the frequent energetic contractions, hypertrophy of the muscular walls takes place, and these losing more and more of their elasticity, become gradually very stiff and rigid. If dilatation of the obstructed part is not undertaken, the irritation of the mucous surface caused by the impacted feces, etc., will soon lead to an ulcerated condition and loss of substance of the mucous membrane. The muscularis will become involved, the serosa undermined, and finally fistulous passages formed.

The stricture itself is seen mostly as a cicatricial ring surrounded by hard connective tissue. Sometimes it has but a very small opening, in other cases we find it in the form of a more or less long rigid tube with a narrow or wide lumen. Occasionally two or three strictures separated by partially healthy mucous membrane are met with. The patients complain of a feeling of pressure and sensation of burning and soreness in the region of the stomach. Loss of appetite, flushing, irregular heart-action, drawing sensation in the lower limbs, nervous irritability and often deep hypochondriasis, are some of the chief symptoms. Obstinate diarrhoea often exists, furthermore. Gradually the local symptoms become more prominent; drawing pains in the loins and frequent desire to stool develops. For these high-lying strictures the sudden desire to stool on awakening in the morning is a characteristic symptom. Instead of feces, only mucous matter is passed with much straining. The ribbon-like form of the feces often gives a clue to the disease in strictures near the anus, but in strictures situated high up in the rectum the feces usually have their normal form. They are sometimes, however, similar to those of sheep, small, hard balls. The patient rarely has the feeling of complete evacuation of the bowels. The mucous secretion becomes more and more abundant, obstipation increases. In the worst cases, if no dilatation of the stricture takes place, the stagnation of the feces leads to peritonitis and death. A very important symptom appearing relatively early in the course of the trouble and pointing to its grave nature, is the rapid



wasting away of the patient, the loss of strength and cachectic appearance, differing scarcely from that of those afflicted with carcinoma. A careful examination per rectum will show in most cases the real nature of the disease. Kümmell advises in all cases, where there is protracted catarrh of the larger intestine, which has resisted treatment, and is undermining the strength of the patient, that a careful examination of the rectum be made, either digital or instrumental. An ordinary œsophagus sound is well suited for the diagnosis of high-lying strictures. Through it water may be injected to distend the folds of mucous membrane obstructing its introduction. Sounds of whale-bone with olive-shaped ivory heads are also useful instruments for this purpose, as is furthermore Allingham's rubber balloon constructed for a like object. The author uses a whale-bone sound having a sponge attached to its further end, the sponge being, when introduced, in a compressed state, and gliding easily through the strictured part. On withdrawing the sound more or less force must be exerted, as the sponge, swollen and much increased in size, is obstructed by the stricture. In this manner the position and size of the latter may quite well be determined. For the diagnosis and knowledge of the relative positions of several strictures, repeated examinations must be made. In some cases it will be necessary to dilate the lowermost stricture before anything positive regarding those higher up can be arrived at.

Errors in the diagnosis of these high-lying strictures are frequently made, and numerous cases of this kind have been recorded. Such a case was published by Syme. The obstruction to the sound on its introduction, which was supposed to be a stricture, was found, in the autopsy, to have been the promontory. When a stricture is present, its nature should be, if possible, determined; whether, namely, of cicatricial origin, or arising from compression of the rectum by pathological conditions of the uterus, bladder, prostate, or by exudations or tumors in the smaller pelvis, etc. In some cases it will be extremely difficult to determine whether the stricture be due to a cicatricial process or a malignant neoplasm. This is, of course, of great importance in the treatment. The following case of the author's will be instructive from this point of view: Patient, a man, æt. 56, had experienced



a sudden large hemorrhage from the rectum, followed, however, by no further symptom of disease. But gradually pains in the loins and limbs, general weakness and debility developed, causing him to seek medical assistance. Carcinoma of the rectum was suspected by his physician, but digital examination gave negative results. On introducing bougies, however, a stricture was felt about 13 cms. above the anus. It was passable for an instrument of 12 mm. thickness. Gradual dilatation was kept up, the health of the patient improving rapidly. When seen by the author, about four months after the hæmorrhage had occurred, he did not at all present the appearance of an invalid. This favorable condition, however, changed shortly afterwards, the patient showing the almost unmistakable look of one afflicted with carcinoma. Nine weeks later a digital examination detected the existence of a carcinoma. Radical extirpation was followed by recovery. In cases of doubtful diagnosis the patient should be kept under observation for some time before a positive expression of opinion is given. The cases are numerous and well known where syphilitic strictures, accessible to view and touch, have been treated as malignant growths.

For dilating high-lying strictures the so-called elastic and wax bougies are the best. They should be employed, however, with some care, and are not sufficiently long to be serviceable in all cases. Those of Allingham are thick and hollow, and composed of the same material as Nélaton's catheters. If this bougie is compressed in the stricture, it may be filled with water, quicksilver, fine shot, etc. There are, furthermore, solid soft rubber bougies, long and elastic, with olive-shaped points. Before introducing a bougie the bowels should be evacuated and the rectum irrigated with warm water. The patient lies on a bed or sofa, with the breach protruding over the edge. A gradual, slow introduction of the well-oiled bougie, with frequent intermissions, will easily overcome any painful and disagreeable sensations in the anus, contractions of the sphincters, etc. It is not advisable to allow the bougie to remain too long, as no permanent dilatation of the stricture will be attained by this procedure, but the intestinal catarrh, present in all these cases, will be aggravated. Five to ten minutes will suffice for the desired effect. Nor will it be wise to introduce

more than two different instruments at one sitting. At the commencement of treatment, the bougies should be introduced every two to three days ; later on, when dilatation has progressed considerably, less often. Even after all symptoms of disease have disappeared, the bougie should be occasionally employed, to prevent, if possible, any recurrence of the stricture. Absolute rest will be necessary in nervous, irritable and anæmic individuals, especially at first. Symptoms of peritonitis, irritation, painful fissures, etc., may cause the treatment to be suspended at times for a while. Such incidents happen in spite of the greatest care. The use of a bougie by the patient himself in these cases of high-lying strictures should therefore be but sparingly allowed, and only then in the advanced stages of the treatment and after the patient has shown his ability to do this. Froriep reported a case where the instrument, slipping from the patient's grasp, perforated the intestinal wall, causing death. Troublesome symptoms, such as the catarrh, etc., should be removed as far as possible. Irrigation with warmed solutions of alum, tannin. corrosive sublimate, once or twice daily, especially after defecation, are beneficial. In cases where ulcerations exist, König advises the use of a weak solution of the chloride of zinc, which acts well on the ulcerated parts, but does not affect the normal mucous membrane. Burning sensations in the rectum, tenesmus, etc., may be relieved by warm sitz baths, suppositories of opium, etc. Allingham recommends in cases of pain and burning in the pelvis and for the intense neuralgia often felt about the sacrum, the use of an ointment composed of morphia and bismuth. For its proper application to the membrane of the rectum, he has constructed a hard rubber bougie on the plan of a syringe. This is passed, closed into the rectum, and its contents then ejected from the numerous lateral openings. Disturbances of the digestive organs, from which these patients invariably suffer, will require suitable treatment. Nourishing and easily digestible food should be given. For the constipation light laxatives may be employed. Diarrhœa, on the other hand, generally resulting from irritation of the hard, impacted feces, will disappear usually after the instrumental treatment has begun. Preparations of bismuth, naphthalin, etc., may

be employed, however, but the use of opiates and styptica should be guarded against. It will be advisable in those cases, where the patient shows the consequence of long-standing intestinal occlusion, with meteorismus, symptoms of peritonitis, debility, etc., not to delay with attempts at dilatation, but to proceed at once to the establishment of an artificial anus. When these symptoms have disappeared and the health of the patient permits, treatment of the stricture may be undertaken, and the attempt made to bring about defecation in the normal way.

The prognosis will be favorable in those cases when the strictures are accessible to treatment with bougies, and this is not too long delayed. As regards the results of the treatment, much will depend on the greater or less extent of the destruction in the mucous membrane, and on the patience and energy displayed by both patient and physician. Kümmell gives the histories of two cases which illustrate the above-mentioned symptoms, etiology, diagnosis and result of treatment, in a very characteristic manner.

CASE I. Male, æt. 51, has resided for nine years in the tropics. In 1873 he contracted syphilis and suffered in 1879 from an attack of dysentery, which gradually assumed a chronic form, resisting all treatment. Patient returned to Europe in 1880, and, after a month's sojourn at a cold-water bathing establishment, was discharged cured. A short time afterwards, however, the old symptoms of disease returned. He consulted a physician, being then very much reduced in strength, anæmic and complaining of much pain in the loins, occasional diarrhoea and frequent desire to stool, especially on rising in the morning. Only some mucous, bloody matter and small amount of hard feces would be passed, the patient only finding relief after two or three movements of this kind. Digital exploration of the rectum revealed nothing abnormal. On introducing a bougie, however, an obstruction was felt about 14 cm. above the anal opening. Bougie introduced daily and left for fifteen minutes to an hour. After treatment in this manner for about eight months, patient was cured, all objective and subjective symptoms having disappeared. Failing, however, to follow the advice of having a bougie introduced from time to time, to pre-

vent any possible return of the stricture, the old troubles reappeared in 1884, two and a half years later. When seen by the author, patient was in great suffering. The stricture was discovered 14 ctm. above the anus, and was not passable for a medium-sized sound. Symptoms of peritonitic irritation and a painful fissure of the anus caused frequent interruptions in the treatment. The general condition of the patient improved, however, as the dilatation of the stricture progressed. In the course of six to seven months the troublesome symptoms subsided, and the stricture admitted the largest sized bougies. Defecation was normal and painless, appetite excellent and general appearance healthy. Bougies are still employed every five to six weeks. Patient is well and strong, eats and digests the heartiest kinds of food.

CASE II. Male, æt. 42, has resided eleven years in the tropics, where he has suffered from several violent attacks of diarrhœa, but with no symptoms of dysentery. From time to time he has been troubled with disturbances of the digestive organs, and these being attributed to climatic influences, patient returned to Europe. He was treated for a long time for gastric catarrh, as all the symptoms seemed to point to the stomach as the seat of his trouble. For past two years large quantities of epidermis-like masses and mucus have been passed in defecation. The feces are small and hard. Patient never has the feeling of complete evacuation of the bowels after defecation. Chest organs normal, and digital examination of the rectum gave no result. Catarrhal condition of the mucous membrane of rectum. On introducing an elastic bougie, an obstruction was felt, about 13 ctm. above the anus. A whale-bone sound with a medium-seized olive-shaped head could be passed through the stricture, and detected the existence of a second stricture about three to four ctm. above the first. Dilatation with heavy rubber bougie daily. In two months' time both strictures were passable for very large sounds. A third stricture, circa 3 ctm. in length, was then discovered lying about 21 ctm. above the anus. Dilatation of the latter was difficult at first, but in the course of fifteen months the lower strictures were completely removed, and the uppermost was passable for the thickest instrument. There was

still some catarrh of the intestine. Patient is well at present and enjoys normal appetite and good digestion. A large bougie is introduced from time to time.

C. J. COLLES.

### OSTEOCLASIS.<sup>1</sup>

(Continued from Vol. IV., p. 421).

*Collin's apparatus.* The first instrument invented by M. Collin (in 1879) made use of the leverage of the leg in order to break the femur. It had consequently the fault of exerting its strength on the ligaments of the knee, and has given place to another form, produced according to Pousson, after M. Collin had seen how M. Robin had avoided this defect. It is, therefore, not necessary to describe Collin's first apparatus in this article. Nevertheless, very good results were obtained by this machine, including the successful breaking down of a mal-united Pott's fracture. Pousson gives an illustration of the osteoclast of Taylor, of New York, and compares it with Collin's first apparatus. It, however, obviously works with much less leverage, and could be made to break the femur near either extremity without straining the ligaments of the knee. No statements are made as to its safety or danger.

*Robin's apparatus.* Its great merit is that it reduces to a minimum the length of leverage required and thus, for example, enables the surgeon to break the femur just above the condyles without throwing the slightest strain on the knee. Therefore, in producing his osteoclast, M. Robin solved the main problem in connection with instrumental osteoclasia.

Robin's apparatus consists of a wooden plank to support the thigh (the patient lies on his back), of a metal plate to lie on the front of the thigh, and therefore slightly gutter-shaped with the concavity on the lower surface (that which touches the thigh), of two steel bands or hoop-segments, of four screws, of a leather collar and a lever.

<sup>1</sup>*De L'Ostéoclasie*, par le Docteur Alfred Pousson, Paris, J. B. Bailliére et fils, Paris, 1886.

The plank is placed on the table in such a way that the whole length of the femur lies upon it, the patient being on his back. This disposition is absolutely necessary, for, otherwise, a movement of rotation and a consequent oblique fracture may be expected at the moment of operation. The plank is in two parts which can be approached or separated so as to adapt the appliance to thighs of different lengths. The plank is padded with leather, especially at the upper and lower edges. The upper (steel) plate or gutter is similarly padded. It embraces the upper surface of the thigh. It is not much arched downwards at the sides, lest it should interfere with the lateral expansion of the soft parts and imprison the limb too tightly.

The steel hoop-segments are placed across the steel plate, one near each end, and are then screwed down to the plank by four perpendicular screws. In this way the thigh is fixed between the wooden plank below and the steel plate above. The screws are driven home by a key, which has a spring near the handle so arranged as to indicate when the screw force used is sufficient, but not dangerous.

It is *absolutely necessary to screw the plate firmly down on the thigh and thus fix the latter absolutely*. Otherwise, a neat and precise fracture at the exact spot desired cannot be expected.

The compression process above described forces the artery and the sciatic nerve towards the inner side of the femur and does not compress either.

The knee must be extended before the screws are tightened, otherwise the skin will be dragged on.

The leather collar is placed on the condyles, and its extremities, pierced with eyelet-holes, are hooked on to the runner of the lever. The collar should be short, and the lever thus brought as near to the patella as possible.

The popliteal vessels lie snugly between the condyles, safe from pressure.

Having thus adjusted each part of the apparatus, the surgeon seizes the lever and produces a succussion (*secousse*), continuous for a few seconds, rather than violent, for he otherwise might exceed the degree of force just necessary to determine complete fracture.



As soon as ever the fracture is completed the limb must be freed. A simple mechanism permits this to be done in a moment.

Passing to the new osteoclasts, the author gives a number of experiments, nineteen in all, made by Demons, of Bordeaux, and by himself upon the femora of adult subjects, with Robin's apparatus. All these tended strongly to prove the precision, safety and high value of the procedure. It is true one serious accident occurred, namely, tearing away the anterior crucial ligament from the condyle. But the experimenter blames his own inexperience for this (it was his second experiment), and the series as a whole tends to show that, with experience in the use of the machine, came wonderful precision and neatness in the place and character of the fracture.

Four experiments of fracture of the leg by Robin's osteoclast are given. The first produced disastrous results, the second was less mischievous, the third and fourth were very successful. The author attributes these various results to the proper use of padding in the latter cases, and to the neglect of it in the former.

Satisfactory experiments on the lower end of the radius are also described.

A very favorable account is also given of the results produced by Collin's osteoclast (his new form). This chiefly contrasts with Robin's in that it acts sideways while the latter breaks from antero-posteriorly.

*After-treatment, sequelæ and accidents* of the operation.

M. Robin does not rectify the position of the broken bone until six or eight days after osteoclasis. During the first week a splint is applied molded to the limb in its deformed state before operation. "Thanks to this mode of proceeding," we are told, "rupture and stripping up of the periosteum, and, consequently, general and local reactions (fever, pain, swelling, hydrarthrosis), are avoided."

Quite exceptionally, after the application of Collin's apparatus, Mr. M. Reclus, Gillette and Verneuil have observed the appearance of a small, grayish and numb spot in the skin, which, however, never mortified. Billroth once noticed temporary paralysis of the external popliteal.

Serious injuries to the joints, *e. g.*, relaxation of ligaments, hydrar-



throsis, have occurred, but less frequently than the above related experiments on the dead body might lead one to expect.

In a small minority of cases there is a slight febrile reaction after the operation.

Modifications of Robin's machine can be applied to any part of any of the limbs.

When the knee is ankylosed at a right or acute angle and it is desired to break the femur just above the condyles, the limb is placed on its outer side, and the osteoclast, specially modified for the purpose, breaks it from without inwards.

Some excellent cases are given of the correction of mal-united Pott's and Colles's fracture.

*Immediate effects of osteoclasia—Anatomical lesions which it causes.* The results of M. Aysaguer's numerous experiments on manual osteoclasia are thus summarized: In young children about 2 years old the bones have such flexibility that complete fracture is not generally obtained. They bend and straighten again like a fresh branch of a tree, and there is no solution of continuity in the periosteum. There is "infracture," not true fracture. Above 4 or 5 years of age there is almost always rupture of the periosteum and true fracture. This fracture is always simple, generally transverse, slightly dentated. The peripheral soft parts are constantly uninjured, presenting neither ecchymoses nor bruises. The rupture of the bone (the tibia) always takes place at the spot where the thumbs (on the knee, if it be used) are applied. In half the cases the fibula gave way exactly at the same level as the tibia. In the others it was produced one or two centimeters above or below. But these observations apply to osteoclasia of the diaphyses. When the manual *brisement forcé* is applied with a view to curing genu valgum the anatomical lesions are very variable and sometimes considerable to an alarming extent. At all events, such is the case where the patients are passed the age of childhood. M. de Santi experimented on subjects between 18 and 22 years of age, and in 12 limbs, there was no epiphysal separation, but nine times rupture or detachment of the external lateral ligament, and twice a bit of the condyle was torn away with it. Once the condyle was broken away bodily, making a fracture into the joint.

Collin's first apparatus was effective in separating the epiphysis even in adolescents from 14 to 20 years of age, but it produced other lesions, considerable and even alarming. Even the semi-lunar cartilages have been displaced by it.

There is not unfrequently intense pain for from twenty-four to forty-eight hours after the operation. It often coincides with hydrarthrosis. Both soon disappear.

Before the use of the new osteoclasis one or two very serious cases of arthritis and periostitis were reported. Loose joint has also resulted, and even one pseudarthrosis (Boeckel). In the last case the parents removed the splints in the fifth week, and may, therefore, be blamed for the evil result.

Then follows an excellent chapter containing numerous statistical facts respecting the application of osteoclasis to mal-united fractures. This chapter concludes, however, with a valueless and narrow comparison of osteoclasis with osteotomy which, for example, quite fails to take into account that osteotomy has often been only undertaken after osteoclasis has failed.

The number of osteotomies taken for comparison is 37; of these 7 were attended with abundant suppuration or erysipelas.

I will only remark that I have myself done eleven antiseptic osteotomies for mal-united fracture, and should have been grieved and surprised to have seen one suppurate.

Valuable tables of cases of osteoclasis are added.

*Osteoclasis applied to the treatment of rachitic curvatures.*

M. Pousson, after discussing the indications for osteoclasis in these affections, compares it with osteotomy for the same diseases, somewhat to the advantage of the latter. He gives 98 "osteoclases" without a death, and, indeed, without any serious complication.

M. Delens, who had given up osteoclasis for MacEwen's osteotomy, has now, after seeing and using Collin's osteoclast (second form), given up osteotomy in favour of machine osteoclasis. Even Demons (of Bordeaux) the French translator of MacEwen's book, has been converted from the advocacy of osteotomy for genu valgum to that of osteoclasis.

That theoretically possible accident, arrest of growth as a consequence of injury to the epiphyseal cartilage, has not once been observed.

There is a dearth of observations made *years* after osteoclasis. Lannelongue says that cases operated on in the old way afterwards suffered from an extreme sensitiveness in the knee-joint to changes of temperature and a tendency to the formation of osteophytes at the line of fracture or epiphyseal separation.

The duration of treatment is somewhat long after manual osteoclasis of adults owing to the sprain, etc., inflicted on the joint.

The force required to break a bone has by no means any fixed relation to the age and strength of the patient.

The new machine osteoclases contrast with the old notably in that only a small minority of the former, but the large majority of the latter suffer from lively and prolonged pains in the neighbouring joint after operation.

Consolidation and bony union take place as quickly after the new mode of osteoclasis as after a simple transverse fracture caused by accident. Age has a considerable influence on this process. The younger the patient the more rapid the union.

Two, three or four weeks more, generally, suffice for complete recovery of the strength and suppleness of the limb.

In comparing osteoclasis for genu valgum with MacEwen's osteotomy, M. Pousson regards both as absolutely without danger. He points out that as osteoclasis requires complicated apparatus, many surgeons, especially those resident in remote districts, will prefer osteotomy. He concludes, from a study of the cases recorded, that convalescence and complete functional restoration of the limb are notably quicker after osteoclasis by the new machine method than after MacEwen's osteotomy.

*Osteoclasis applied to the treatment of ankylosis and of some other articular affections.*

M. Pousson analyzes 36 osteoclases of this class, of which 18 were of the hip, and 14 of the knee. He says that the orthopædic results were :

Perfect in	-	-	-	-	-	-	24
Satisfactory in	-	-	-	-	-	-	3
Tolerably satisfactory in	-	-	-	-	-	-	1
Bad in	-	-	-	-	-	-	2

The original affections leading to the ankylosis were :

	Times.					
Traumatic arthritis	-	-	-	-	-	5
Tubercular	"	-	-	-	-	7
Puerperal	"	-	-	-	-	2
Scarlatinal	"	-	-	-	-	2
Typhoid	"	-	-	-	-	1
Epiphyseal	"	-	-	-	-	1
Rheumatic	"	-	-	-	-	1
Suppurating	"	-	-	-	-	4
Indetermined	"	-	-	-	-	10

In none of these cases did osteoclasia produce any relapse, although in one case, originally a traumatic arthritis, where the splints, etc., were removed too hastily, a violent inflammation resulted. But this did not attack the joint itself, only the seat of osteoclasia. Two or three years had usually elapsed between the date of the original disease and that of operation. All the patients were adolescents or more or less young adults.

When an ankylosis is at a too acute angle for one osteoclasia to remedy it satisfactorily, Robin suggests two, one above, the other below the joint. The alternative is a cuneiform osteotomy.

M. Pousson's comparison of osteoclasia with osteotomy in this class of affections is like his other similar comparisons, very inferior in value to the rest of his admirable book. He cites only 22 linear osteotomies of the hip, with 2 deaths. Now, I have myself done 22 without any fatality, and all with excellent result, and I expect that Volkmann has done nearly as many, though he prefers the wedge operation. When osteoclasia comes to be done everywhere in isolated cases by surgeons who have had no previous experience of the operation, we may hear of some mischief being done. I consider osteotomy of the hip to be as safe as that of the femur for genu valgum, when the sur-

geon knows how to do it. M. Pousson, however, comes to the conclusion that it is a very grave business.

I cannot conclude this article without formally offering my thanks to the author of the book under notice for the complete, logical, honest, and altogether excellent manner in which he has laid before the profession an account of what is evidently destined to be a surgical procedure of high value and of frequent applicability. The work is both practical and scholarly.

C. B. KEETLEY.

# INDEX OF SURGICAL PROGRESS.

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## GENERAL SURGERY.

**I. Treatment of Erysipelas.** By Dr. W. OTTO (Rudolph Hospital, Vienna). In 1883 Barwell reported five cases of erysipelas very successfully treated by exclusion of air. For this purpose he used white lead paint. Dr. J. Breuer related to the author a favorable case similarly treated with liquor gutta-perchæ as an air-excluder. Otto uses a solution of 2 parts wax, 20 parts dryer and 100 linseed oil. With this he makes repeated applications over the affected part and a hand's breadth beyond. Five hospital cases are described and four dispensary patients mentioned. In all the temperature very soon fell, the pain stopped and no further extension occurred. The fact that erysipelas spreads through the upper layers of cutis may possibly depend on the accessibility of oxygen. [Local applications of lead paint, collodion, vaseline smeared on thick, etc., are esteemed by many American practitioners. *Reptr.*—*Wien. Med. Woch.* 1886. No. 43.]

**II. A Contribution to the Pathogenesis of Actinomycosis of the Lung.** By Dr. J. ISRAEL (Berlin). Israel's present case was that of a Russian driver, æt. 26, who had usually slept on straw or in hay lofts, and sometimes drank from the same trough as his horse.

After some pain in the left side of the chest in October, 1886, abscesses formed below the left nipple; these increased in number and developed ulcers. On admission in August, 1885, there was marked emaciation and considerable contraction of the left side of the thorax—the latter covered with abscesses and sores whose secretion contained abundant actinomycosis-granules. The muco-purulent sputum—at times tinged with blood—always contained the same. Death the end

of March, 1886, from diarrhoea, resulting from amyloid degeneration of the abdominal organs.

A single focal cavity in the lower part of the left upper pulmonary lobe, close to the anterior surface. From this the process had freely perforated the front wall of the chest.

In the actinomycotic pulmonary cavity was a lentil-sized foreign body which proved macroscopically, microscopically and chemically to be a fragment of a tooth.

This is the first positive of proof of the view which I. had previously advocated, viz., that pulmonary actinomycosis does not result from the inspiration of germs in the air but from the aspiration of germs from the oral or adjacent cavities, carious teeth evidently being one of the primary seats.

In the discussion, Roser (Marburg) noted an acute and a chronic form of actinomycosis. König (Göttingen) spoke of seeing dispensary cases frequently. Esmarch had seen ten cases with one death. The patients are almost always cattle men.—*Centbl. f. Chirg.* 1886. No. 24. Report of XV. German Surgical Congress. *Arch. f. klin. Chirg.* Bd. 34, Hft. I.

W. BROWNING (Brooklyn).

**III. A Case of Actinomycosis of the Lung.** By A. J. OCHSNER, M.D., (Chicago). Male, æt. 56, stock-raiser by occupation. After a history of severe pain in the antrum for some months, a spontaneous discharge of pus into the pharynx, with establishment of a permanent fistula, gave relief—this in 1878. Some of the discharge finds entrance into larynx during sleep, exciting severe cough. In 1880 antrum was trephined from the mouth, scraped and irrigated, the irrigation being continued daily for two years. In 1882, simultaneously with change of residence, Northern Mexico, and the territory between it and Colorado, the antrum closed and the general health was much improved. In 1885 pulmonary symptoms, consisting of suffocative sensations and cough began to trouble him. Expectorates mucus and blood, and in this sputum the characteristic fungus of actinomycosis is readily found by microscopic examination. His position is



stooping, the chest is full in front, and there is a decrease of motion on the left side, with dulness, roughened respiratory sounds and numerous mucous râles. Below the upper border of the fifth rib, and throughout the right side the sounds are normal.

The man has been engaged in raising, buying and selling, and handling large numbers of cattle for more than forty years. Among these animals there were many suffering from the disease known as lumpy-jaw, and it was the practice of the patient to cure the animals thus affected, by freely opening the abscess by crucial incision, extirpating as much as possible of the lump and introducing about one drachm of powdered arsenic into the cavity. Repeating this once or twice, usually effected a permanent cure.—*Chicago Med. Jour. and Exam.* Dec. 1886.

L. S. PILCHER (Brooklyn).

**IV. A Case of Actinomycosis.** Dr. WM. O'NEILL (Lincoln). A farmer, æt. 50, had been "dressing" calves affected with what he called "ring-worm." In a few weeks he was attacked with a pustular eruption on the left wrist and forearm, and a slight, apparently glandular swelling under the right ear. When (one month afterward) he first consulted Dr. O'Neill, there were also four or five smaller swellings in the neighborhood of the clavicles and one in the left axilla. Iodine and arsenic given internally, citrine ointment locally. Skin eruption almost disappeared in a few weeks, tumours slowly diminishing. But, after two months of treatment, tonsillitis and aphthous looking state of mouth.

Next month, mouth better, but two or three new enlargements appear; some of old ones larger. The one below the ear was as large as a small hen's egg, smooth, nearly painless, elastic, and slightly movable. Other smaller swellings, one beneath chin, one on back of head.

Now, sublimate and pot. iod. internally, iodide of ammon. ointment externally.

Next month, appearances much better, but unfortunately severe bronchitis set in. On its subsidence, the tumour, etc., are left much worse.

“The tumours in the angle of the neck had extended in all directions, more especially downwards. It had also suppurated, and two or three sinuses gave exit to a whitish purulent fluid, which frequently contained small yellowish particles. The sore generally presented a reddish granulating surface, but occasionally dark colored scabs would form on it. Several of the smaller tumours on the lower part of the neck had nearly disappeared, but the one under the chin was still large enough to be uncomfortable, and the tumour on the back of the head had become as big as a walnut, and, although unulcerated, was so painful that he could hardly sleep on his back. A small swelling had also formed under the left ear.” The increase of temperature and pulse-frequency less than might have been expected.

At this stage iodide and bromide of ammonium were commenced. But, the tumours continuing to enlarge, the opinion of Mr. A. E. Barker was sought with a view to surgical, operative treatment.

Dr. O'Neill found the micro organisms “supposed to be peculiar to the disease.”

Speaking of the calves with so-called “ring-worm,” Dr. O'Neill says, “there are no lumps at present under the jaws, or in or about their mouths. Ring-worm began in them, as well as in several others, by the hair falling off, a reddening or inflammation of the skin, and the formation of ash-colored scabs, more or less thick, according to the severity of the disease in the part affected. The disease is caused by a fungus which can be destroyed by sulphur or by mercurial preparation, notably by corrosive sublimate.” But Dr. O'Neill had not, up to the date of his paper, identified the fungus of the calf's disease with that of actinomycosis.

Up to recent years, actinomycosis has probably been confounded with scrofula and cancer, with the former in its early stages, and with the latter in its ulcerated stages.

About one-half of the published cases have been fatal. The disease may attack almost any organ in the body.

O'Neill thinks that iodine, arsenic and mercury have some power over the disease in its early stages.

But, after all, where actinomycosis appears in the shape of externa,

tumours, he thinks that the most expeditious and the best treatment would be *removal by surgical operation*.

Actinomycosis appears to have been first discovered by Italian veterinary surgeons and accurately described by Revolta in 1868. Bollinger rediscovered it, and named it in 1877, and, in the following year, Israel described the first case in man.

C. B. KEETLEY (London).

### OPERATIVE SURGERY.

**I. New Method of Amputation at the Ankle-Joint.** By Prof. A. C. TAUBER (St. Petersburg, Russia). After having criticized

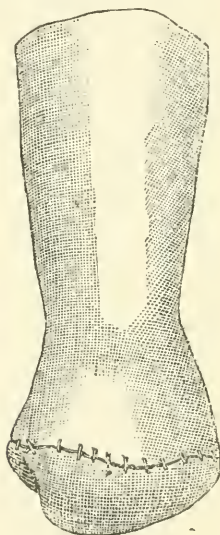


FIG. 1. STUMP PRODUCED BY TAUBER'S METHOD.

the methods of operation at the ankle-joint, introduced by Syme, Malgaigne, Roux, Sedillot, Le Fort and other surgeons, Prof. T. has demonstrated in the first congress of the Russian physicians his own method which is a modification of Pirogoff's. Fig. 1 shows a stump made according to Tauber's method. His operation Prof. T. performs as follows.

He begins an incision at the attachment of the tendo Achillis (A, Fig. 2) and carries the knife forward, below the malleolus, to the Chopart's line (B, Fig. 2), and then across to the dorsum of foot,

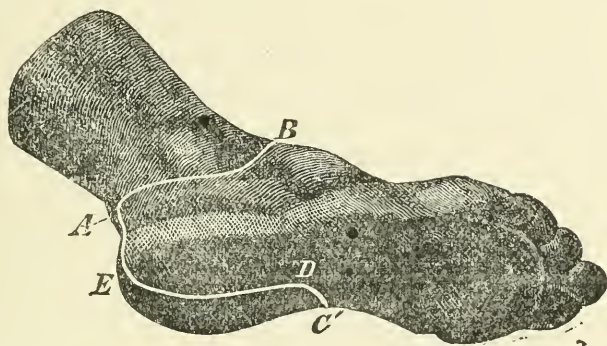


FIG. 2 LINE OF INCISION ALONG OUTER SIDE OF ANKLE.

down, (from B to C, Fig. 3); on having reached the middle line on the plantar surface (D, Fig. 2), the knife is carried backward to the heel and then upward to the starting point (D E A, Fig. 2). In this

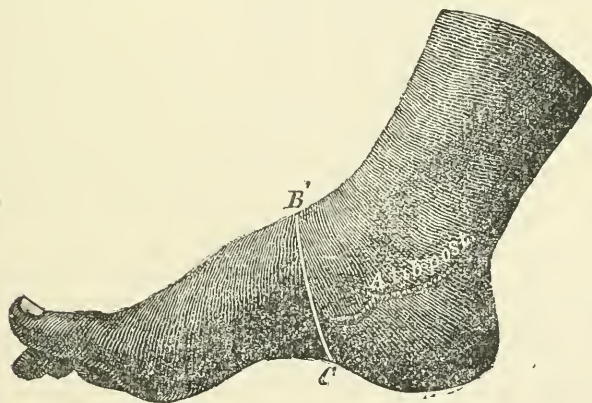


FIG. 3. LINE OF INCISION ALONG INNER SIDE OF ANKLE.

*first stage* of operation Dr. T. cuts the skin and other soft tissues to the very bones.

In the *second stage* Prof. T. opens the ankle-joint in the usual manner, that is, he cuts ligaments in this order, lig. fibulare-tali post., lig. fibulare calcaneum, and lig. fibulare-tali ant.; then arkr. lig., and at last the deltoid lig.

In the *third stage* Dr. T. dissects out the astragalus and cuts off the foot in the Chopart line. While an assistant firmly holds the os calcis by forceps, Prof. T. saws off the external half of the bone, in the line

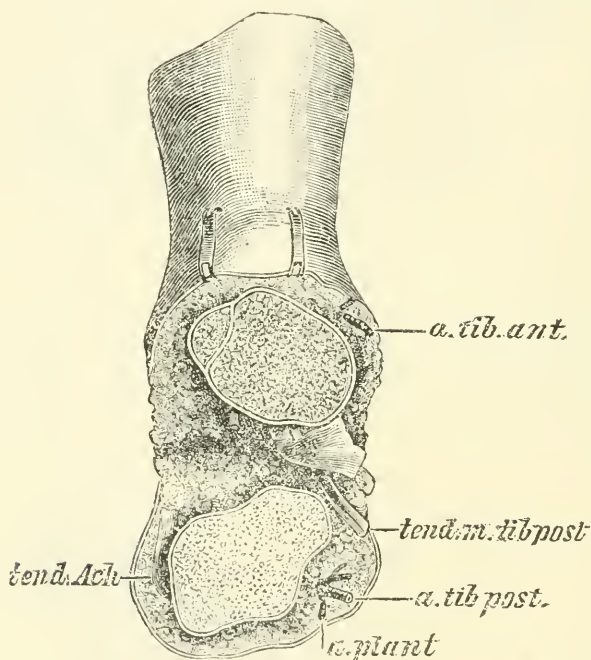


FIG. 4. THE FLAP COMPLETED.

corresponding to the one first made in the skin (B C Fig. 3). Thus the interior flap of the heel contains a thick, almost square part of the os calcis and the poster. tibial artery not injured (see Fig. 4).

In the *fourth stage* Prof. T. saws off the malleoli, puts ligature on the arteries, severs and adjusts the two surfaces of the bones to each other, which is easily done without any extension of the tendo Achillis, as can be seen in Fig. 4. Lastly the wound is united with sutures.

The advantages of this method consists in the following points: The poster. tibial artery remains intact, saved for the stump (see Figs. 3 and 4); the tendo Achillis and bursa mucosa retro-calcanea remain uninjured, and the surfaces of the bones sawn off will correspond to each other (see Fig. 4), thus favoring the process of ossification.

In 1877, during the Turko-Russian war, when there were many soldiers with frozen feet, Prof. Tauber tried his method with gratifying results. He believes that in his method preserving the poster. tibial artery there is far less danger from the necrosis of flaps than in the other methods. As to the technique of the operation Tauber's method seems to be less complicated than those of the surgeons mentioned above. However, experience is needed to prove all that Prof. T. claims for his method.—*Vratch* (St. Petersburg). No. 5. Jan. 30, 1886.

P. J. POPOFF (Brooklyn).

#### VASCULAR SYSTEM.

**I. Laparotomy in the Treatment of Spontaneous Gluteal and Sciatic Aneurism with a Report of Three Cases, in One of which Both Internal Iliac Arteries were Tied at the Same Time for Double Gluteal Aneurism of Simultaneous Development.** By F. S. DENNIS, M.D., (New York). (1) Laparotomy in no way increases the dangers of the operation of ligature of the internal iliac artery. (2) Laparotomy prevents a series of accidents which have occurred during the performance of the operation of ligature of this artery by the older methods. Among these accidents may be mentioned the division of the circumflex and epigastric arteries, wounding the vas deferens, including the ureter in the ligature, puncture of the iliac or circumflex veins, tying the genital branch of the genito-crural nerve, stripping up and tearing the peritoneum, injury to the subperitoneal connective tissue and other accidents of a like nature. (3) Laparotomy enables the surgeon to apply the ligature at a point of election, and affords him an opportunity of obtaining information as to the exact extent of disease in the main arterial trunk. (4) Laparotomy averts the dangers which were likely to follow ligature



of the internal iliac artery by the older operations, among which may be cited peritonitis resulting from tearing up the peritoneum posteriorly, cellulitis, purulent œdema, pelvic abscess, septicæmia and pyæmia. (5) Laparotomy occupies much less time for its performance in order to expose the internal iliac artery than was occupied to reach the vessel by the incision of Cooper or Abernethy. As gluteal aneurism, as a rule to which there is but one exception (which is doubtful), progresses steadily and rapidly to certain death from hæmorrhage, expectant treatment is out of the question.

Other methods have not proven eminently successful, the operation of Antyllus giving according to Holmes, four recoveries out of five cases; that of Anel, two recoveries out of four cases; perchloride of iron injection, four recoveries out of six cases; proximal compression on the aorta with direct compression, failure; ligature of the internal iliac by an incision parallel with Poupart's ligament and pushing back the peritoneum, six recoveries in eleven cases. It being recognized, however, that the Hunterian method of ligature of the main artery on the proximal side gives the best results, particularly where elastic compression is inapplicable as in the present instance, it remains to find a satisfactory way of applying it; from the recapitulation at the beginning of this abstract, laparotomy would seem to supply the desideratum. The author relates three cases, two of which occurred in his own practice: *A.* The first case occurred in a woman, æt. 60, who presented pulsatile tumours in both gluteal regions, the tumours dating back a year and a half, and pain in the region, three years back. The external parts being thoroughly purified, an incision in the median line from the umbilicus to the symphysis pubis was made, the pelvic viscera, which would have hindered the operation, drawn without into warm moist sponges and towels, the internal iliac arteries of both sides ligatured in succession with catgut, the viscera returned, the external opening closed and antiseptic dressing applied; the patient died with suppression of urine and slight parenchymatous nephritis on the third day thereafter. *B.* The second case occurred in the practice of Dr. W. L. Chew, of Birmingham, Ala., and was a gluteal aneurism of the right side of a male negro, æt. 46, the trouble dating back seven

months. By a curved lateral incision the abdomen was opened, owing to the violent efforts of the patient and the difficulty of manipulation, a few coils of intestine drawn out, strong silk ligature applied to the internal iliac, the parts cleansed, the incision closed and antiseptic dressing applied. Prompt adhesion occurred with rapid diminution of the tumour and cure. C. The third occurred in a female, æt. 18, and was associated with an aneurismal varix, the left side being affected; the trouble dating back many years. Under careful antiseptic precautions, the abdomen was opened, the incision finally extending from the symphysis to some distance above the umbilicus, the intestine drawn out sufficiently to permit the exposure of the vessel, a double twisted catgut ligature applied to the left internal iliac, the guts returned, the external incision closed and antiseptic dressing applied; the patient rallied quickly and the bowels moved normally on the fifth day; a slight acute albuminuria due to congestion of the kidney from the ligature of the main trunk of the internal iliac appeared on the following day, but soon disappeared. The aneurism together with the aneurismal varix was perfectly cured. These cases would seem to demonstrate satisfactorily the availability of this method of treatment, the only real obstacle to the successful issue of the operation being the occurrence of acute albuminuria, toward the prevention of which the study of surgeons should be directed.—*Med. News.* Nov. 20, 1886.

JAMES E. PILCHER (U. S. Army).

**II. Brasdor's Operation for Aneurisms of the Arch of the Aorta and of the Anonyma.** By Dr. J. ROSENSTIRN (San Francisco). This article contains details and statistics not only of the cases collected by Pilz and by Koch (von Langenbeck's Archiv., Vols. IX and X) and notably by Wyeth (*Am. Jour. Med. Sci.*, 1881), but also of the scattered cases since published besides a new one of R.'s and one from Gerster (New York.)

The operation was doubtless first performed by Mott in 1820, though the first published case was that of Wardrop (London, 1825),

Only of late years has the operation been adopted in Germany.

R. has brought together a total of 99 cases. These he divides as follows:

## LIGATURE OF CAROTID AND RIGHT SUBCLAVIAN, 38 CASES

WITHOUT ANTISEPTICS.				WITH ANTISEPTICS.			
Cured.	Improved.	Not Improved.	Died from Operation.	Cured.	Improved.	Not Improved.	Died from Operation.
2	—	1	3	14	5	5	8

## LIGATURE OF THE SAME VESSELS WITH AN INTERVAL BETWEEN, 10 CASES.

1	3	2	—	—	3	—	1
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## LIGATURE OF THE RIGHT COMMON CAROTID, 31 CASES.

2	2	5	16	3	—	—	3
---	---	---	----	---	---	---	---

## LIGATURE OF THE RIGHT SUBCLAVIAN, 5 CASES.

1	1	1	1	1	—	—	—
---	---	---	---	---	---	---	---

## LIGATURE OF THE LEFT COMMON CAROTID, 10 CASES.

—	2	1	1	2	2	—	2
---	---	---	---	---	---	---	---

Under the second class Smith's case (cure) is not included. Besides the above there are four other cases.

*a.* Schede, 1884, ligature of left carotid and later of left subclavian, with improvement for a time.

*b.* Busch, 1880-1, ligature of left carotid and axillaris. Death three days p. o.

*c.* Wilhelm, 1826, left subclavian vein mistaken for the artery and tied. Death on seventh day.

*d.* Morris, 1882, internal jugular tied by mistake instead of the right carotid. Death on fourteenth day.

Co-ligature of left carotid and subclavian has never been performed, although Busch's case above approximated this.

R.'s patient was a Swedish woman, æt. 42. Present trouble began two and a half years before. Other forms of treatment unavailing. Pulsating. Tumour size of a hen's egg displacing trachea, causing great pain, loss of flesh, etc. He tied the right common carotid and

the subclavian November 26, 1883, in the German Hospital at S. F. The subclavian was readily secured. While freeing the carotid the anterior mediastinal space was punctured and some air drawn in when a compress closed the opening. Silk ligatures. Drainage tube and stitches removed at second change of dressing fourteen days later. The right radial pulse did not reappear until January 20, the temporal until March, 1884. The tumour slowly diminished, though it is still detectable. Pulsation at first diminished also, but of late has returned in full force. Patient last seen in April, 1886. She was again able to fill her place as housekeeper, and was free of her former suffering. Atrophy and wasting of the right arm, following the operation, were remedied by electricity and massage.

Despite the views of Holmes and Marsh (1885) and Küster, R. concludes from a study of the cases that co-ligature of both vessels is preferable to two separate operations. Ligation of the subclavian is certainly the more important part. In several of the cases subsequent autopsy showed the carotid to be still partially open. After briefly reviewing other methods of treatment and their results, he decides that ligation is far the most successful.—*Arch. f. klin. Chirg.* 1886. Bd. 34. Hft. 1.

## HEAD AND NECK.

**I. The Formation of a New Nasal Skeleton from the Frontal Bone.** By Prof. KÖNIG (Göttingen). In cases where the bony framework of the nose has been destroyed, all attempts heretofore at reconstructing a proper profile have failed.

In view of four fairly successful cases, K. here presents a method which he has devised. First, the soft parts (tip and alæ) are made mobile by a transverse cut through the most sunken (saddle) portion of the nose. If this lower part is then drawn down into its normal position, a broad gaping defect appears. This is first bridged over by cutting a  $\frac{3}{4}$  to  $1\frac{1}{2}$  cm. wide oblong flap from the forehead perpendicularly upwards from the bridge of the nose. This flap includes skin, periosteum and cortical layer of frontal bone—the latter being cut around by a chisel. The whole is then loosened by following down

through the diploë with a chisel the exact width of the flap; at its lower end, just at the beginning of the nose, it is bent straight over downwards in front. This brings the skin side of the flap to face the interior of the nose and leaves the bone exposed. Of course, the size of this flap has been so calculated that it just covers the above mentioned defect. At its free end it is so sewed to the apex that the (external) cutaneous border of the latter remains free. To this free edge of skin as well as around the defect, he now sews a cover-flap taken laterally from the forehead.

Hence, the bone-periost-skin flap constitutes the inner lining of the nose. The bony profile of the nose is thus given an ample prominence. Some little corrections may still be necessary about the root of the nose.

His 4 cases included 2 from syphilis, 1 from injury, and 1 in a boy, æt. 15, from necrosis. The good results have proved lasting— $3\frac{1}{2}$  years,  $2\frac{1}{2}$  years, and in two 1 year, have passed since the operation. All his flaps, even when a little less than 1 ctm. wide, have proven viable.

It is better not to operate so long as there is ozoena from necrosis or ulceration. Wood-cuts and lithographs accompanying the article.

K. states that he is trying this method in cases of total loss of the nose.—*Arch. f. klin. Chir.*, 1886, Bd. 34, Hft. 1.

**II. On the Mortality of Operated Hare-lip and Cleft Palate.** By Dr. A. HOFFA (Würzburg). This article adds 80 cases from various operators in Würzburg and Freiburg—1870 to 1885—to previous statistics [*v. ANNALS*, 1886, Jan., p. 80–83]. Of the whole 80, 24 (30%) have since died. Of 64 under one year old, 19 (30%) died before the end of that year. The collective statistics for the first year give 373 cases, with 129 (35%) deaths. Hoffa endeavors to determine how far the fatal results were due to the operation, and how far to the malformation itself. The normal death-rate the first year from an average for various countries, he gives as 25%, leaving 10% due to one or both of the causes mentioned. To determine between these

he divides the respective cases of Fritzschi, Gotthelf, Abel and himself into three classes, according as the chief deformity was: I, hare-lip; II, complete fissure; III, bi-lateral fissure:

Group I.	114 cases, with 27 deaths (23.7%)
“ II.	111 cases, with 43 deaths (39%)
“ III.	41 cases, with 24 deaths (59%).

From these figures, showing progressive mortality as the trouble increases, it cannot be doubted that the malformation itself has a great influence on the mortality. This conclusion is opposed to that of Gotthelf, who blamed the severer operation for the increasing mortality. Those of the III class are usually born weak and atrophic, and with great tendency to respiratory and digestive troubles. The respiratory troubles are remedied to a far greater extent by the operation than are the digestive. H. endeavors by other statistics to further establish his view of the prevailing influence of the malformation itself, rather than the operation, on the mortality, but decisive facts are wanting.

By adding up 620 published cases of all ages, he finds the mortality for the first two weeks p. o. to have been 60 (9.6%); from the second week to the end of the third month in 439 cases it was 67 (15%). Of 336 cases 55 (16%) died between the third month and the end of the fourth year. Of 39 cases of bi-lateral cleft palate with os prominens operated under one year of age, 25 (63%) died within a couple of years. By comparing two curves, one representing the normal death, the other that of the operated children during the first year, he finds that the second to the sixth month, inclusive, is the most favorable time for operating. Dentition, which then begins, shows a deleterious influence. As an evidence of the advantage of operating early he cites a case where the lip was treated, and at the end of three years the previously existing alveolar and anterior palatal fissure had completely healed out,—*Arch. f. klin. Chir.*, 1886, Bd. 33, Hft. iii.

**III. Contributions to the Theory of Goitre.** By Dr. J. SCHRANZ (Hopfgarten in Tyrol). A two years' experience with this trouble in a region where it is endemic, furnished the incentive to an article on certain points in connection with goitre, especially on the



dependence of alterations in the cardiac action on volume-changes in the thyroid gland. With the enlargement of the thyroid the author has frequently observed that abnormalities appear in other organs of the body—heart affections being one of these.

His collective cases represented 739 goitres amongst 3,304 individuals living and dead—750 private patients with 117 goitres, 557 school children with 245, 1,700 autopsies at the Innsbruck Pathological Institute with 308, and 227 insane at Hall with 68 goitres.

All cases, even the lighter forms, are included, though in younger patients it sometimes subsides later. These figures show that the German Tyrol is as much afflicted by goitre as even the worst parts of Switzerland. Still, cretinism and deaf-mutism is rare, the trouble being rather extensive than severe.

In the upper classes in school it was more frequent than in the lower, in harmony with Bircher and others.

Of the 739 cases of goitre, 344 were also the subject of heart trouble; 47 of the latter had valvular lesions, the balance hypertrophy, dilatation, fatty or other degeneration, or clinically, abnormal heart-action. In the same region heart affections in the non-goitrous and phthisis, are not very frequent, *e. g.*, of 174 heart cases amongst 1,307 individuals (school children and private patients), 115 also had goitre. His statistics, like those of other observers, show a slight excess of females amongst the goitrous. When the affection is one-sided, it has a great predilection for the right, collectively 92 r. to 19 l., the separate lists also bearing this out.

Hill residence slightly tends to increase the number of goitrous (10:9) as might, *a priori*, be expected from their greater physical strain.

As to geognostic conditions, argillaceous slate regions showed a maximum of goitrous, sandstone a minimum.

In a table are shown the results of examination of the drinking water in the various districts where the school children lived. From these, however, he is unable to draw any positive conclusions.

To return to the influence on the heart, he says: "There is no doubt that enlargement of the thyroid and abnormalities of the heart very frequently occur together." As to the innate connection between

the two, various possibilities have to be considered. The symptoms point to a disturbed and especially a weakened heart-action. The return of blood to the heart is impeded partly by direct pressure on the veins, partly by compression of the trachea and interference with respiration. The introduction of a more or less voluminous vascular network into the circulation also directly increases the strain on the heart. In the one case dilatation, in the other over-action and hypertrophy result, and in both cases, finally, degeneration of the heart. This result (hypertrophy or dilatation, with or without fatty degeneration) is observed in all autopsies of long-standing cases where the goitre has exerted pressure. In many cases heart trouble is certainly caused by goitre, but there are reasons for thinking that the reverse also occurs, amongst others the fact that in several cases goitre developed immediately after over-action or hypertrophy of the heart, and repeatedly disappeared again as soon as the heart trouble subsided.

That the enlargement of the thyroid may in many cases be the result of a vasomotor neurosis seems to have been first suggested to him by the following case: A girl with a small goitre, but no sign of heart trouble, was attacked by a peculiar, almost continuous, cough for three days and nights, with further symptoms (almost imperceptible radial pulse, increased second pulmonary sound, dry rhonchi, face pale, extremities cool, etc.) pointing to spasm of the vaso-motors, forcing an over-quantity of blood into the lungs. Meanwhile the goitre became smaller. A half year later, after an exhausting foot tour, an enormous goitre developed within forty-eight hours—the customary cough disappearing entirely, the heart acting steadily, face and extremities natural. This was the exact opposite of the earlier condition. S. believes it to have been but the expression of a relaxed condition of the vasomotors, a somewhat similar relaxation being normally observed after like exercise. Again, a boy suffered an extensive burn of the *face*. During exfoliation and suppuration a goitre developed. When the wounds healed the goitre disappeared. This S. explains by the fact that irritation of the skin causes a local anæmia, followed by vasomotor paralysis. For further corroboration, he makes a comparison with Graves' disease. In the early

stages bromide, not iodide, is in place. When, however, hyperplasy has resulted, the iodides are of value. In this, as in Graves' disease, though less often, similar cardiac conditions occur. Sudden death is common to both forms.

Physiology teaches us many agencies which depress the vascular tonus—straining work of any kind, tiresome marches, climbing, forced playing on wind instruments, difficult births, rapid temperature changes, lowered atmospheric pressure, use of alcohol, etc. The resulting condition may in these cases become permanent. These are also the most frequent causes of goitre, as S.'s cases show. Seacoasts are also free from goitre, whilst the Alps, Cordilleras and Himalayas are its home. In his region the atmospheric pressure is from 40 to 60 mm. Hg. lower than at the sea level. A variety of other factors, such as temperature changes and greater physical strain, combined with the lowered atmospheric pressure in elevated regions.

In harmony with this theory is the fact that goitre occurs more frequently in youth and amongst women, their vascular tonus being more mobile.

The goitrous tendency might be gradually developed where generations continue under favoring conditions.

This alteration in the vasomotors would explain the heart troubles as well as the goitre. The five drunkards amongst the lunatics were all goitrous, and four had also cardiac affections.

As to the relation of goitre to cretinism, cachexia strumipriva, etc., he merely makes suggestions.

He remarks that any procedure requiring narcosis or in any way straining the heart is in the goitrous especially dangerous, and that their fate depends on the heart.—*Arch. f. klin. Chir.*, 1886, Bd. 34, Hft. i.

W. BROWNING (Brooklyn.)

**IV. Œdematous Laryngitis. Tracheotomy. Glossitis Terminating in Abscess. Severe Hæmorrhage from Tongue. Recovery.** By D. H. CHARLES, M. D. The patient was a healthy man, æt. 44, who had had a slight laryngeal inflammation

from exposure to cold a month before. This subsided, but recurred soon after, and he had suffered more or less with his throat for three weeks prior to the severe attack now described.

He was suddenly attacked, whilst at work, with urgent dyspnœa, and with difficulty got home. Soothing medicated inhalations, diaphoretics and a purge were at once employed, with blistering and hot compress over the larynx. When Dr. Charles saw him, two days later, he had all the characteristic symptoms of œdematous laryngitis; and the laryngoscope showed great reddening and swelling of the epiglottis and false cords. The affected parts were swabbed with nitrate of silver solution (3j: ʒi), followed by great and almost immediate relief. Ten hours later he was seized with urgent dyspnœa and almost asphyxiated.

Laryngo-tracheotomy was now performed, and was followed by immediate relief of all the alarming symptoms. He was surrounded by an atmosphere of steam vapour.

¶ Next morning the tongue was greatly swollen and purplish, and protruded between the teeth. It was incised in two places. Fed through a tube.

Next day, breathing still easy. The tongue greatly enlarged. Swelling and tenderness of right side of neck from ear to clavicle.

Tongue again incised, and one ounce of blood escaped. This relieved him, and three days later there was considerable discharge of fetid pus from the tongue.

Purulent matter and blood continued to be discharged from the mouth during the next two days.

On the third day there were six attacks of hæmorrhage, the exact source of which could not be ascertained. Solution of perchloride of iron applied on lint to right side of tongue.

Next day there was severe hæmorrhage from a ragged cavity at right side of root of tongue, which was stuffed with lint soaked in perrhenate of iron solution. Plug removed two days later. There were slight recurrences of hæmorrhage, one on the day after the plug was removed and two subsequently, but the patient progressed favorably and is now quite well, with the exception of some wasting and loss of

power in the right side of the tongue. This, however, is getting less.

In his remarks on the case, the author refers to the marked but only temporary relief afforded by the application of nitrate of silver. He contrasts this with the complete and permanent relief of dyspnœa, following laryngo-tracheotomy, and justifies the choice of this operation rather than tracheotomy on the ground (first) of its being easier to perform under unfavorable circumstances (*i. e.*, with little assistance and in inconvenient position), and (secondly) for a reason which is less obvious—"to keep the incision as high as possible." He considers the inflammation of the tongue as an extension from the epiglottis.

He regrets (we think rightly) not having made much more extensive incisions in the tongue. Might not the epiglottis and antero-epiglottidean folds have been scarified in the first instance?

With reference to the hæmorrhages which occurred, Dr. Charles speaks of being prepared to tie the external carotid. (Why not the lingual?) He thinks the wasting and loss of power of the right side of the tongue due to inflammatory degeneration of the muscular tissue.

The mortality of the affections which he gives, according to Sestier, as 158 out of 213, and, as reported by Bayle, 16 out of 17 seems excessive. Durham gives 19 out of 30—*Brit. Med. Journal*, Nov. 6, 1886.

B. WAINEWRIGHT (London).

**V. Two Cases of Acute Glossitis.** Dr. TOTHERICK. Both cases occurred in the Wolverhampton General Hospital.

CASE I. E. R., æt. 21, tongue covered by thick, brown fur, hard, immensely swollen, tip projecting half an inch beyond teeth; immovably fixed. Great pain and tenderness on pressure. Salivation profuse. Breath very offensive. Deglutition difficult. Headache, pulse increased, and temperature slightly raised. Gradually completely recovered.

CASE II. J. P., æt. 27, sudden swelling of tongue. The condition was exactly similar to preceding case. Slight albuminuria. There was some slight superficial sloughing under tongue and gums. In this case an incision was made on either side of median line of tongue. Made a good recovery.

As a rule, acute glossitis ends in resolution. It may, however, extend backwards to the larynx and render laryngotomy necessary. In a few cases suppuration occurs; and still more rarely, permanent thickening may be left. The most usual cause for it is said to be "catching cold," and it is supposed by some authorities to be catarrhal in its origin.—*Lancet*, Oct. 16, 1886.

**VI. Malignant Cysts of Neck.** Mr. F. TREVES. The clinical course of the three cases on which this paper was founded were all similar. The growths were considered to be cystic on account of their containing a very small amount of solid material. One cyst contained pure lymph, in the other two the contents were mucinoid. One specimen (still alive) was shown. The first case when seen was fifty-three years of age. The tumour was situated in the left side of the neck, the skin over being red and brawny. It commenced as a small mass, apparently beneath the sterno-mastoid muscle, and was regarded as a chronic abscess, until an exploratory puncture gave exit to a clear, glairy fluid, which was pronounced on chemical analysis to be mucin. The cyst proved to be deeply attached. It discharged continuously, was treated with injection of iodine; the discharge became purulent, and finally hæmorrhage took place and closed the scene. At the post-mortem there was an imperfect cyst, whose walls were nowhere more than half an inch thick. The inner aspect of the walls resembled the columnæ carneæ of the ventricles of the heart. The second case was that of a woman, æt. 52, in which the solid carcinoma formed one-sixth part of the whole mass. This cyst was removed during life; the internal jugular vein was cut, and the brachial plexus exposed; patient died ten days after. The cyst closely resembled the preceding one. The third was epitheliomatous. The patient in whom it occurred was 43 years of age, and had been operated on for epithelioma of the right side of the tongue. Fourteen months after the tumour appeared on the left side of the neck. The skin over it was red and brawny, and on being tapped yielded a fluid chemically similar to lymph. Bleeding also occurred in this case. The cyst wall was not more than a quarter of an inch thick in any part. No secondary deposits.—*Lancet*, 1886, Oct. 23.



**VII. Acute Myxœdema Following Thyroidectomy.** Sir WILLIAM STOKES. A woman, æt. 18, was admitted into the Richmond Hospital with extensive disease of both lobes of the thyroid. Health good, fresh complexion, well nourished; family history good. Her chief trouble was dyspnœic attacks, usually at night. It was decided to remove the gland. Sir William removed it by the method advocated by Kocher. He mentions the great difficulty he experienced, and the profusion of the hemorrhage, which at times seemed uncontrollable and threatened the patient's life. In the end only the left lobe was got away. The patient made a good recovery, was relieved of the dyspnœa and the right lobe somewhat diminished in size. This, however, did not last long, as the lobe again began to enlarge and dyspnœa came on again. With still greater difficulty and danger the lobe was removed. Within fourteen days puffy swelling was noted about eyelids, backs of wrists, and over metatarsus of both feet. Also some mental torpidity. She also had fits, characterized by great lividity of face, stertorous breathing, dyspnœa, quick pulse, eyes staring and protruding, pupils dilated, and carotids throbbing, ending in copious perspiration. No albuminuria. All these symptoms increased, and pulmonary infiltration supervened. She died nineteen days after the last operation. Sir William draws attention to the marked myxœdematous symptoms and to their rapid onset. He then mentions two other cases of thyroidectomy done by himself, in one of which he partially removed the gland with permanently good result. In the other, division of the isthmus was followed by a satisfactory issue.—*Brit. Med. Jour.*, Oct. 16, 1886.

**VIII. On the Surgical Treatment of Certain Tumours of the Neck.** FREDERICK B. JESSETT, F. R. C. S. Mr. Jessett advocates a somewhat bolder surgery in dealing with deep tumours of the neck. He views with very little fear ligature of both carotid artery and internal jugular vein. Even division of vagus, sympathetic, phrenic, laryngeal nerves have been divided with "only temporary inconvenience."

In one of the cases operated on there was a large growth, which

had formed slowly, deeply seated and extending from the ear nearly to the clavicle, and quite immovable. No pain, but congestion of conjunctiva, some opacity of cornea with a central ulcer, also ptosis. Left half of face redder than the right, and apparently warmer. Treatment left condition of eye unaffected. The growth was then removed and found to consist of caseous glands. The man made a good recovery, and within a week the ocular troubles disappeared. Mr. Jessett goes on to narrate several cases of both innocent and malignant growths which have been extirpated with good results, and sums up as follows : (1). All innocent tumors in these regions may be removed. (2). That malignant growths may be removed when situated in the triangles of the neck, provided they are freely movable, that the skin and superficial structures are not implicated, notwithstanding their size and the possibility of the large vessels being implicated in the growth.—*Brit. Med. Jour.*, Oct. 16, 1885.

**IX. Adenoid Growths in the Pharynx.** Sir WILLIAM B. DALBY. These growths can be removed by many methods, and if done thoroughly the result is always satisfactory. If the operator is possessed of an efficient finger-nail, nothing can be better, but all surgeon's fingers are not sufficiently adapted to and strong enough to remove some of the firmer kinds of growth. In these cases Sir William Dalby recommends his artificial finger-nail. The instrument is so made that the sensitive tip of the finger is uncovered, and is most useful in estimating by touch what is being done. By this method also the head can be bent forward, and by this means the blood is prevented from running downwards. Then, again, the artificial nail works so thoroughly that all growth can be removed at one sitting. In children it is best to employ an anæsthetic. Besides, the departure of the three symptoms, viz, the tendency to Eustachian obstruction, the consequent deafness (which generally directs attention to the trouble), and the nasal obstruction—which follows the removal of the adenoid growths, there are other advantages to be reckoned, such as the better prospects of recovery in cases of diphtheria or scarlet fever occurring, with an empty rather than a blocked pharynx, as well as the better chances of the middle ear escaping destruction during diseases

The improvement also of the general health, with free nasal breathing, as well as diminished tendency to bronchial affections, require only mention to be appreciated.—*Lancet*, Oct. 2, 1886.

H. H. TAYLOR (London).

**X. Congenital Stenosis of the Trachea from Abnormal Curvature of the Cartilage Rings.** By Dr. M. SCHMIDT (Cuxhaven). Female child, æt. 6 months, well developed and nourished, had, since her birth, always much difficulty in breathing. At times violent attacks of dyspnoea with accompanying cyanosis of the lips and cold sweats, especially during the night. Loud inspiratory stridor always present. Nostrils much distended, especially on inspiration. The deep inspiratory drawing-in of the epigastrium and lower sides of the thorax, where not only the intercostal spaces, but large portions of the thorax-walls were sunken in even, very noticeable. Nothing abnormal about the neck, nor did a digital examination of the orifice of the larynx, per os, reveal anything that could cause the symptoms above mentioned. The inspiratory stenosis-murmur resembled closely that of laryngeal croup, and pointed to the larynx as the point of obstruction to the breathing. Tracheotomy proposed. Four days later crico-tracheotomy performed and a canula introduced. This had no beneficial influence whatever on the dyspnoea, and the condition of the patient remained unimproved. Collapse soon followed, the pulse became weak and frequent, and death ensued the next day. At the autopsy it was found that the larynx, œsophagus, thyroid and thymus glands were normal. The trachea was dissected free of its surroundings, and nothing abnormal observed when inspected posteriorly. On opening it, however, (in the usual manner, posteriorly in the middle) and spreading it out, the upper cartilage rings yielded easily to the pressure as usual. Lower down, on the contrary, the left sides of the rings were stiff, offering considerable resistance to the pressure made on them in this way, and turning more slowly inward. When the whole trachea was spread out it was seen that the curvature of the upper rings was quite flattened out, while the left sides of the lower rings formed with their anterior portions a sharp angular crease. This caused a veritable ridge in the lower portion of the trachea, appearing

on the mucous surface of the organ as a vertical line at the boundary of the anterior and left lateral parts. Along the line the curving of all the lower rings was broken by the angular bend inwards. In the lower portion of the trachea on the left wall was also a somewhat concave impression as if caused by the pressure of an egg-shaped body. This reached down to the bifurcation; the angle, where the left bronchus joins the trachea, appearing in consequence, somewhat rounded out. The length of the affected portion of the trachea, from the bifurcation upward, measured 2.8 cm., the whole length of the trachea to the cricoid cartilage being 4.6 cm. No cause for the stenosis was found. This deformity of the trachea would satisfactorily explain the phenomena observed during life. The stenosis, while great enough to give rise to the dyspnœa and continued stridor, had not been sufficiently large to cause death. Complication with the operative trauma was followed by fatal results. The opening made in the trachea being situated above the stenosed portion, and the lower end of the canula not reaching it either, of course no beneficial result to the patient could take place. Inferior tracheotomy alone could have accomplished anything. Author considers the case one of congenital stenosis of the trachea, caused by faulty curvature of the cartilage. His case is instructive, as demonstrating that in similar cases where tracheotomy is indicated, it will be well to do this as low down as possible.—*Deutsch. Med. Wochenschrift*. No. 40. Oct. 7, 1886.

**XI. Isolated Extirpation of the Cricoid Cartilage for Ecchondroma.** By Dr. A. BOCKER (Berlin). Rokitsanski reported cases of hyperostosis and exostosis of the ossified larynx cartilages, but to Virchow we are indebted for our knowledge of ecchondroma of the larynx. They are found as diffuse and smooth growths, also as knotty circumscribed excrescences, on both the thyroid and cricoid cartilages, having the general tendency of growing inwards, into the lumen of the larynx. Ecchondroma may be easily mistaken for polypi, being covered with normal mucous membrane. They are not operative from above. The number of published cases is small. Those of Macilvain (1831) and Ryland (1835) should not be included, as it is somewhat

probable that both were cases of hyperplasia of the connective tissue, as we often see in syphilis. The first authenticated case is that of Froriep, published in 1834. The chondrom, the size of a walnut, was situated on the inner surface of the larynx, extending far into the lumen and resting on the right vocal chord. A second case was reported by Mackenzie in 1880. The chondroma, as large as a hen's egg, arose from the cricoid cartilage, growing downwards and in front of the anterior surface of the trachea. Türk reported the first laryngoscopical observation (*i. e.*, on the living subject) of such a tumour, in 1863, and to this must be added a case of Störk in Vienna, one published by Ehrendorfer, and lastly a case reported by Asch, in 1884.

The author gives the following cases:

Case I. Male, æt. 23, healthy in appearance, and showing nothing abnormal about the neck. Laryngoscopical examination disclosed a small tumour, the size of a bean, covered with normal mucous membrane, lying just beneath the right vocal chord quite near its anterior attachment. It arose from the inner surface of the thyroid cartilage near the anterior line of union. The anterior end of the right chord was raised upwards somewhat and displaced outwardly by the tumour. The membrane of the rest of the larynx was normal. Examination with the sound showed the tumour to be hard and knotty and firmly attached to the lamella of the thyroid. Attempts to grasp it with a forceps were unsuccessful. Its entire removal was finally effected with the help of a cutting forceps, constructed on the plan of those of Luer. The speech of the patient was completely restored. The tumour consisted of hyaline cartilage.

Case II. Male, æt. 62, of middle size, pale and slender appearance. Had had difficulty in breathing for some time, which had increased of late. No pulmonary catarrh. A distinct stenotic murmur heard during quick inspiration. Laryngoscopical examination. Larynx showed no inflammatory process. On intonation the vocal chords closed in the normal manner. On inspiration, however, a somewhat rounded, oval tumour was seen extending into the lumen of the larynx from its posterior wall just beneath the posterior end of the vocal chords. It arose from the whole inner surface of the lamella of the

thyroid and the neighboring left arch of the cricoid cartilage, reducing the lumen of the larynx so much that but a sickle-like aperture remained for breathing. Tumour had a smooth surface, being about the size of a hazelnut. Swallowing easy. Extirpation advised. Tracheotomy first, with division of the three upper rings. Digital examination showed the tumour to be immovable, its place of attachment being the same as described above. A tampon-canula of Hahn was introduced, the cricoid cartilage divided in the median line. The cricoid was so much involved in the neoplasm, that the removal of the tumour alone was not possible. The incision, therefore, lengthened upwards to the hyoid bone and the whole cricoid excised. Hæmorrhage was considerable. Wound washed out with solution of corrosive sublimate and plugged with iodoform gauze. No fever followed the operation. Patient could eat and drink without difficulty or discomfort. A secondary hæmorrhage occurring five days later, exhausted the patient somewhat, but did not otherwise affect his recovery. Discharged cured in five weeks. The tumour had the structure of hyaline cartilage and showed a regressive metamorphosis of the cellular elements. Various changes in the larynx of the patient took place after removal of the cricoid. The chords appeared shortened and wobbled somewhat on intonation. The arytenoid cartilages approached nearer one another, and on inspiration the chords rested against each other. Patient wears a canula, closing it when speaking or using a simple ventilated canula of Bruns. His voice is distinct but hoarse and rough. He is healthy and feels well and strong. Bruns lately operated a case of ecchondrosis of the larynx, arising from the plate of the cricoid, by chiseling it off. The canula could, of course, be dispensed with afterwards in this case.—*Deutsch. Med. Wochen.* No. 43. Oct. 28, 1886.

C. J. COLLES (New York).

#### ABDOMEN.

I. Contributions to the Theory of Hernia. By Prof. E. KUESTER (Berlin). Besides the hernia inguino-properitonealis of Krönlein and the h. inguino-interstitialis of Goyrand (v. ANNALS, 1886.



March. P. 242), Küster here makes out a third probably related form which he calls *hernia inguino-superficialis*. The first form is characterized by the diverticle, which forms the hernial sac in the common external inguinal rupture, being forced in between peritoneum and transverse fascia; the second form by the second part of the sac lying in front of the transverse fascia between the muscular layers of the front belly-wall; whilst in the third variety, here distinguished, the sac comes out through the anterior inguinal ring, does not sink into the scrotum, or only partially, but turns either up and outwards under the skin of the abdomen, or out and downwards under the skin of the leg, or backwards under the perineum.

He gives the history of three new illustrative cases, two of which were operated, one of the two giving an opportunity for a post mortem examination.

The peculiarities of the three cases are summed up as follows:

1. The hernial sack is an open peritoneal diverticle, in which lie testicle and spermatic cord. Consequently they are exclusively congenital (in the sense of being existent but not developed). The hernial opening is wide, and traverses the belly-wall directly from front backward.

2. The testicle has not descended into the scrotum, but is in the vicinity of the external inguinal ring, sometimes at a distance from it but always ectopied.

3. The testicle is always atrophic, the spermatic cord in most cases too short.

4. In two cases the spermatic cord did not lie on the median side of the hernial sack, as is otherwise the case in inguinal hernia without exception, but on the lateral side.

5. The sack is covered exclusively by skin and the attenuated superficial fascia. The infundibuliform fascia and cremaster muscle are either entirely wanting or but slightly developed.

A fourth double-sided case he mentions having seen, and includes abstracts of the few more or less corresponding cases to be found in the literature.

K. next considers the operative technique in hernia of such viscera

as are not wholly covered by peritoneum, cœcum, colon, etc. In this case a wide displacement of the peritoneum may have drawn the attached intestine along into the sack. Such ruptures are either congenital, or at least old and large.

A variety of difficulties may arise in operating, and as no definite plan of procedure seems to have been laid down, K. gives a case to show his method. It consists essentially in preparing back the sack and adjacent peritoneum, thus allowing reposition. In congenital cases this is interfered with by the fan-like constituents of the spermatic cord as they course over the sac. However small, the testicle is usually atrophic. It can be removed and the radical operation completed.—*Arch. f. klin. Chirg.* 1886. Bd. 34. Hft. I.

W. BROWNING (Brooklyn).

## EXTREMITIES.

**I. Treatment of Ingrowing Toe-nail with Tannin.** PHILIP MIALI (Bradford). A communication from Switzerland in the *British Medical Journal* for October 23 recommends the local application of perchloride of iron with rest. I have for many years used tannin for the same purpose, and do not find rest necessary. A concentrated solution (an ounce of perfectly fresh tannic acid dissolved in six drachms of pure water with a gentle heat) must be painted on the soft parts twice a day. Two cases recently had no pain or lameness after the first application, and went about their work immediately which they could not before. After about three weeks of this treatment the nail had grown to its proper length and breadth, and the cure was complete. No other treatment of any kind was used, though formerly introduced lint under the ingrowing edge in such cases. One of the patients was a mill-girl and the other a housemaid, and both were on their feet many hours a day.

## BONES, JOINTS, ORTHOPÆDIC.

**I. Excision of the Elbow-Joint with Suture of the Olecranon to the Lower End of the Ulna.** Mr. C. F. PICKERING (Bristol). A strumous girl, æt. 15. Longitudinal incision over back

of joint. Tip of olecranon then cut off with a sharp chisel, and joint thus opened. "Diseased ends of bones" were then removed. Afterwards tip of olecranon was united by a strong wire suture to the sawn surface of the ulna. Patient made a good recovery.

Operation was in February. In September, "the power of extension is good, better than that of flexion; the latter has been delayed by the greatly wasted condition of the biceps." Wire left in.—*Lancet*, Oct. 2, 1886, p. 628.

C. B. KEETLEY (London).

**II. Five Hundred and Sixteen Cases of Compound Fracture with Points of Especial Interest Observed in Connection with them.** By F. S. DENNIS, M. D., (New York). In this paper the author states that he has modified his former opinion that the dressing in compound fractures should remain undisturbed during the entire period of repair, and, as a result of certain unhappy experiences where displacement had taken place under the dressing and marked deformity resulted, he now inspects the fracture after eight days and then again after ten days, after which no serious deviation can occur. He strongly emphasizes the desirability of early antiseptis, and advises antiseptic irrigation as soon as the patient is seen and the application of a temporary dressing before the patient is removed to the hospital. In a case of fracture of the skull with meningeal hæmorrhage in which, after exposing the bleeding point with the trephine, he was unable to seize it with artery forceps on account of the dura mater receding before them, he passed a tenaculum through the dura in such a manner as to include the artery in its curve, relaxing that portion of the membrane so that the traditionally difficult manœuvre of ligature of the meningeal artery could be performed with ease; no inflammatory trouble ensued. He also relates two cases of the formation of a surface clot, resulting from epidural hæmorrhage by *contre coup*, without fracture, and recommends exploratory trephining in case such a condition is suspected. After a few remarks upon fatty embolism and insanity after fracture of the skull, he expresses his belief in the origin of certain cases of sarcoma in fracture of the

affected bone, and relates two cases in which the growth could be traced directly to that causation; epithelioma may also develop in the tendo Achillis, the hamstrings, or any other tendons. whose section may render reduction or the maintenance in reduction more satisfactory. After a brief discussion of the greater infrequency of amputation after compound fractures in the present than in the past, which he very correctly attributes to the adoption of antiseptic methods of treatment, he concludes with a brief analysis of his 516 cases, which may be tabulated as follows:

<i>Parts affected.</i>	<i>Number of cases.</i>	<i>Number recovered.</i>	<i>Died in 48 hours.</i>	<i>Died from causes other than septic infection.</i>	<i>Died from septic infection.</i>	<i>Transferred immediately.</i>	<i>Required primary amputation.</i>
Skull	107	68	31	7.—(1). From exhaustion and inanition, one month after trephining with wound perfectly healed (2 and 3). From irreparable damage to the brain; in one case, the lock of a gun being driven through the skull into the brain, and a fracture of the base existing in the other. (4, 5, 6). These cases died from cerebral softening situated at a distance from the wound. (7). Cause of death not noted.	1		
Arm	15	14	1				
Forearm	23	22	1				
Thigh	53	48	5				
Leg	150	125	8				
Fingers and toes	37	36			1	2	15
Involving shoulder, elbow or wrist-joint (result of accident or operation)	23	23					
Involving hip, knee and ankle joints.	40	33	1	2.—(1). From tuberculous meningitis, following some weeks after a resection of hip-joint. (2). Chronic Bright's disease soon after wiring the patella.			
Involving carpal and metacarpal, tarsal and metatarsal joints.	24	24					
Superior and inferior maxillary bones (4 required suturing by silver wire).	28	28					
Ribs and nasal bones.	13	12	1				
Ilium	9	1					
Total. - - -	510	436	48	9	2	2	19

Excluding the 48 cases which terminated fatally during forty-eight hours, the 19 cases which required primary amputation and the 2 cases which were immediately transferred from the hospital at their own request, and there remain 447 consecutive cases of compound fracture with only 2 deaths, giving a mortality of less than .5%; if, now, the 61 cases of compound fracture of the bones of the hand and feet be excluded as too insignificant, in accordance with the custom among all surgeons in their statistical reports of cases, there still remains 385 cases of compound fracture with but a single death, giving a mortality of less than  $\frac{1}{3}\%$ . In comparison with this, attention is called to the fact that previous to the adoption of antiseptic methods, the rate of mortality in the best of tables varied from 20 to 60 %.—*Med. News*, Nov. 13, 1886.

JAMES E. PILCHER (U. S. Army).

#### GENITO-URINARY ORGANS.

**I. On the Pathology of Hæmatocele.** P. RECLUS (Paris). In a long article on the pathology of hæmatocele M. Paul Reclus, basing his remarks on the fact that inflammations of serous membranes are secondary to those of the organs they envelop, suggests the term "pachy-vaginalitis" as giving an exact notion of the disease and relating it to similar lesions in the meninges. The cause is nearly always an injury or some habitual irritation, so slight sometimes as to escape notice; for example, the frequent contusion of the testes on the pommel of the saddle in riding. The gland must here suffer more than the serous covering. It becomes irritated, the circulation is slackened, a small quantity of blood fibrine spreads out over the serous membrane, and this is repeated, so that fresh layers form. It will be found that the epididymis being more vascular and less protected than the testicle, which has its tunica albuginea, suffers more than the latter, and that the different layers of blood have it generally as their centre, the internal ones being those which are thickest and most recently formed.—*Gaz. hebdomadaire de Med. et de Chir.*, Sept. 24, 1886.

L. MARK (London).



## II. Against Distending the Bladder for Epicystotomy.

By Prof. VON DITTEL (Vienna). Last year Von D. Reported 400 cases of operation for calculus (*v. ANNALS*, 1885. Oct. Pp. 334-5) to which 50 later cases are now added.

He first criticizes the of late favorite plan of injecting the bladder before the suprapubic operation. In a former article he suggested the possible superiority of air for such injection, as it would first distend the crest of the bladder instead of the fundus, and might cause less harm if it ruptured through into the tissues. But this latter advantage would be slight unless, as he then supposed, the tear was in the anterior wall. Experiments on twenty cadavers have shown, amongst other things, that such is not the case. The quantity of water requisite to produce rupture of the bladder ranged from 300 to 5,000 grms. (in subjects from 2 to 74 years of age). Of 15 ruptures from injection with water 7 were through the anterior and 8 through the posterior wall. The exact localization of the tear depends on many conditions, as the remains of previous morbid processes, the great variation in the general shape of the bladder and the arrangement of its detrusor fibres, etc. The effect of such filling in raising the peritoneal fold in front also varies widely. As to air, owing to its compressibility, more is tolerated. Three experiments gave 1,200, 1,650 and 2,100 cc. respectively; in a fourth, after injecting 3,000 cc. air, it required 300 grm. water to rupture; in another, where 1,800 cc. air was borne, 1,800 grm. water caused rupture. In the first three the tear was through the posterior wall.

It may be urged that such quantities are not required in practice, though this does not hold for three of his experiments where 300, 600 and 800 grms. caused rupture. Moreover during life cases are met with where the bladder contracts so strongly that even under deep narcosis nothing can be injected into the bladder.

Any operative method must be decided by clinical observation and this also shows the danger of injections. In a case of Prof. Weinlechner's on a child the high operation was done after a small injection into the bladder. It was found at the autopsy that a small diverticle near the incision had burst. A like fatal result in a 5-year-old boy

with a large calculus was reported by Von D. in his previous list. After 100 grms. had been injected the resistance diminished. Operation. Death in three days. Rupture of posterior vesical wall, starting from a small diverticle. Another case of Weinlechner's on a man *æt.* 67, is here reported. After washing out the bladder for a few days 200 grms. were injected provisional to operating. Bloody fluid came back for the first time, probably, as the autopsy indicated, from beginning rupture though the man had a stricture. A colpeurynter containing 200 grms. was introduced (into the rectum) and 300 grms. fluid injected into the bladder; 200 more were needed before the bladder appeared. Fluid tinged with blood in the prevesical tissues showed that rupture had already occurred. Death in twenty-four hours. There was an oblique circular tear through mucous membrane and subjacent muscular layer, extending from the posterior wall around on the left to anterior. The mucous membrane was polypous, *œdematous*, injected, and in wide patches cicatricial resembling a serous membrane. A fourth case is quoted from Guyon (*v. ANNALS*, 1886. April. P. 347.

He does not doubt that some way of avoiding this danger will be devised, but holds that for the present the method involves too great a risk. [It will be noticed that this article deals almost wholly with the volumes injected, but gives no exact data as to pressure.]

His last 50 cases include 1 lateral, 1 median and 9 suprapubic operations, 2 lithotripsies and 37 litholapaxies. Of the 9 epicystotomies 5 died, 2 certainly from the operation, 3 perhaps only in part; in no case did infiltration of urine into surrounding tissues occur. The 39 operations by crushing gave no fatal results; ditto the 2 perineal operations.—*Wien. Med. Wochen.* 1886. Nos. 42-46.

WM. BROWNING (Brooklyn).

**III. Use of Cocaine for Litholapaxy.** By T. J. VDOVIKOVSKY, M. D. (Odessa, Russia). Having paid a glowing tribute to the American surgeons (Bigelow, Otis, Weir, etc.) who have brought about a radical reform in the treatment for stone in the bladder, Dr. V. described four cases of his own in which he used cocaine for litholapaxy.

CASE I. N. K., male, *æt.* 30, for six years had the symptoms of stone in the bladder; was admitted to the hospital on January 11,

1886. He had a stone  $4\frac{1}{2}$  ctm. in diameter, hard, movable; also purulent catarrh of the bladder. On January 20 litholapaxy was performed in one sitting. Having washed the bladder and urethra with 4% solution of boracic acid, 2% solution of hydrochlorate of cocaine was injected in the amount of  $3\frac{1}{2}$  ounces. After 12 minutes the large lithotrite of Bigelow was introduced, the stone was seized at once, and in nine minutes it was crushed 24 times. By aspiration many fragments of stone were brought out. Then the lithotrite of Reliquet was introduced, and the larger fragments of stone were crushed; again aspiration. Then the lithotrite of Thompson was used twice, and all the fragments of stone were washed out. There was no contraction of the bladder at all. The patient began to feel pain only 35 minutes after the commencement of the operation. No fever followed the operation. On the third day the traces of blood in urine disappeared. Catarrh of the bladder was cured in twelve days.

CASE II. M. P., male, æt. 20, was suffering from stone for 16 years. On examination a stone was found, 6 ctm. long, hard, smooth and movable. On February 10, 1886, operation. Four per cent. solution cocaini muriatici was injected, and after 15 minutes Bigelow's lithotrite was introduced. After aspiration the lithotrites of Reliquet and Thompson were used. The operation lasted 1 hour and 53 minutes. In 35 minutes the patient began to feel pain, and in 40 minutes the effect of cocaine seemed to have passed away, therefore the second half of the operation was painful, and toward the end of the operation the bladder began to contract. No fever after the operation. Acetate of lead, nitrate of silver and electricity were used for purulent catarrh of the bladder. The patient left hospital cured, March 20, 1886.

CASE III. V. Z., male, æt. 22, entered the Military Hospital on March 12, 1886. He was suffering from the stone for eight years. A stone was found,  $3\frac{1}{2}$  cm. in diameter. On April 3 Dr. V. performed the operation in presence of several military surgeons who have found out that cocaine had no effect on temperature, pulse, respiration and the pupil of the eyes. The operation lasted about half an hour,

and was painless; no contraction of the bladder was noticed. On the sixth day the patient left the hospital cured.

CASE IV. Dr. I. H., æt. 59, for years was suffering from rheumatism, asthma and stone in the bladder; he was nervous and very sensitive to pain. Dr. Vdovikovsky hardly could persuade his colleague to submit to the operation. The stone was only 2 cm. in diameter, but it was hard and smooth. The operation was performed on April 2. Four per cent. solution of cocaine was used, and Thompson's lithotrite. The operation lasted only 12 minutes, was quite painless, and the patient was very much surprised when he was told that it was all over. The patient was quite well on the fourth day after the operation.

Dr. Vdovikovsky comes to the conclusion that the use of cocaine alone is quite satisfactory when stone is not large and the operation can be performed in half an hour, which is the limit of cocaine's effect. In cases of large stones chloroform is preferable, but even then, if contractions of the bladder are noticed, cocaine is properly indicated.—*Chirurgitchesky Vestnik*, (St. Petersburg), Aug. 1886.

P. J. POPOFF (Brooklyn).

**IV. Two Cases of Supra-pubic Cystotomy.** By M. C. F. GAVIN, M. D., and A. T. CABOT, M. D. (Boston). Gavin's case occurred in an old ex-soldier of dissolute habits, æt. 52, with stricture of the urethra (which contained two fistulous openings, the result of false passages in attempting catheterization), and partial ankylosis of the lower extremities, by which litholapaxy and perineal lithotomy were both rendered impossible. The fistulæ prevented satisfactory distention of the bladder, but after the inflation of a bag in the rectum, an incision in the median line four inches long exposed the bladder, which was readily caught and opened. Some difficulty was experienced in seizing the stones, which were encysted in pockets in the thickened vesical wall; they were finally, however, seized with lithotomy forceps on being pushed up by an assistant's finger in the rectum. The peritoneum was not seen during the operation.

Cabot's case occurred in a debilitated man, æt. 49, who had suffered

from stone for a number of years; a stricture almost obliterated the lumen of the membranous urethra. The stone was found to be large and, the strictured urethra contraindicating litholapaxy, the supra-pubic operation was decided upon. After introduction of sixteen fluid ounces of water into the bladder, the supra-pubic region was still tympanitic on percussion, but became duller on the distention of the rectal bag, although it never reached flatness. On incision, the peritoneum was seen to extend nearly down to the pubis, but after incising what appeared to be a prolongation of the transversalis fascia below it, it could be drawn up out of the way. The bladder was then incised and a very large heart-shaped stone, weighing 1,180 grains, removed without trouble. Both patients recovered well.—*Boston Med. and Surg. Jour.*, Nov. 11, 1886.

V. Observation on the Male Urethra with Applications to Endoscopy, Litholapaxy and Catheterization. By ORIS K. NEWELL, M.D., (Boston). The author has made a number of observations for the purpose of obtaining the length of the shortest instrument that can be introduced through the male urethra into the bladder, and finds that, as the pendulous portion of the urethra can be folded together so that its long axis occupies not more than from  $1\frac{1}{2}$  to 2 inches, for surgical purposes the length of the urethra is but 4 inches, increased in cases of hypertrophy to a possible six, and an instrument with a length of 5 inches or more is sufficient for any normal subject. Bearing in mind also the large size of the evacuators used in litholapaxy, he has constructed an endoscope having a 30-calibre, with the visceral opening oblique, especially designed for the inspection of the bladder and permitting, what has hitherto not been done, the introduction of instruments through it, so that with suitable forceps, a foreign body can be removed without operation through it. The shortness of the urethra justifies him in shortening the distance between the orifices of the tube of Bigelow's evacuator for litholapaxy from  $15\frac{3}{4}$  to 10 inches, by which he greatly shortens the period for the evacuation of the contents of the bladder in that operation; the tube is straight, which also adds to the readiness of evacuation. The author claims that

the modified evacuator removes fragments four or five times as rapidly as Bigelow's instrument. He also advocates the shortening and increasing the diameter of the lithotrite, believing six inches to be long enough for any divulsor. When a catheter or tube is to be used for washing out the vesical cavity, it should be as short and of as large a calibre as possible, so as to best admit the free passage of fluids, thick mucus, or other matter, although a longer size for convenience of manipulation, is desirable for ordinary purposes. The illustrations of his endoscope do not show the instrument clearly, and his description is greatly wanting in lucidity.—*Boston Med. and Surg. Jour.* Nov. 11, 1886.

**VI. Rules for the Application of Electrolysis in the Treatment of Urethral Stricture.** By ROBERT NEWMAN, M.D., (New York). In a critical paper showing the causes of failure in treating stricture of the urethra by electrolysis, to be due to (1) the incompetency of the operator, (2) mismanagement of the treatment, (3) mistaken diagnosis and (4) faulty instruments, the author presents the following rules as a safe guide to practitioners: 1. Any good galvanic battery will do which has small elements and is steady; the twenty-cell Drescher battery, carbon and zinc, is an excellent instrument sufficient, particularly, for the beginner. 2. The fluid for the battery ought not to be used too strong. 3. Auxiliary instruments, as galvanometer, etc., are important to the expert, but not necessary for the beginner. 4. For the positive pole, a carbon electrode is used, covered with sponge moistened with hot water, and held firmly against the patient's hand, thigh or abdomen. 5. For the absorption of the stricture, the *negative* pole must be used. 6. Electrode bougies are firm sounds insulated with a hard-baked mass of rubber; the point is a metal bulb, egg-shaped, which is the acting part in contact with the stricture. 7. The curve of the bougie is short; large curves are mistakes. 8. The plates must be immersed in the fluid before the electrodes are placed on the patient, and raised again after the electrodes have been removed. 9. All operations must begin and end while the battery is at zero, increasing and decreasing the current slowly and gradually by



one cell at a time, avoiding any shock to the patient. 10. Before operating, the susceptibility of the patient to the electric current should be ascertained. 11. The problem is to absorb the stricture, not to cauterize, burn, or destroy tissues. 12. *Weak currents at long intervals.* 13. In most cases a current of six cells, or from  $2\frac{1}{2}$  to 5 milliampères, will do the work, but it must be regulated according to the work to be done. 14. The séances should be at intervals, not too frequently in succession. 15. The best position for the patient to assume during the operation is that which is most comfortable for himself and the operator. I prefer the erect posture, but the recumbent or others may be used. 16. Anæsthetics I like to avoid; I want the patient conscious so that he can tell how he feels. 17. Force should never be used: the bougie must be guided in the most gentle way; the electricity alone must be allowed to do the work. 18. During one séance, two electrodes in succession should never be used. 19. All strictures are amenable to treatment by electrolysis. 20. Pain should never be inflicted by the use of electrolysis; therefore it should not be applied when the urethra is in an acute or even subacute inflammatory condition. In conclusion, he remarks that in every case that is intelligently and judiciously undertaken, success must and will follow. In the strictest sense of the word there can be no failure in dissolving away the dense tissue that constitutes a stricture, for electrolysis is based upon a fixed chemical action of the constant current on these animal tissues. Electrolysis cannot fail, but operators may and do.—*N. Y. Med. Rec.* Sept. 25, 1886.

J. E. PILCHER (U. S. Army).

#### WOUNDS—INJURIES—ACCIDENTS.

I. Severe Injury from Dynamite. Amputation of Fore-arm. Ligature of Femoral Artery. Gangrene of Leg. Amputation of Thigh. Pyæmia. Severe Reactionary Hæmorrhage. Transfusion of Blood Four Times. Recovery. By MESSRS. ANNANDALE and J. M. COTTERILL. J. P., æt. 23, a quarryman, was admitted on January 8, 1886, suffering from the results of the explosion of some dynamite cartridges. The proper apparatus for

the purpose being out of order, the patient had been warming some of the explosive in an ordinary iron kettle at a "chaffer," when the dynamite exploded. The left hand was completely shattered, and the forearm badly lacerated by the pieces of metal; the posterior aspect of the left thigh was deeply gashed in all directions, the fragments of metal splintering the lower end of the femur, and lying in great quantity among the deep structures of the thigh. The right hand and leg were also severely injured, but to a less extent than the left. Five hours after the accident the hand was removed by Mr. Cotterill by a modified circular amputation above the wrist, and large pieces of the kettle were extracted from the tissues of the forearm and thigh. Amputation of thigh was out of the question, owing to the extreme weakness of the patient, caused by the loss of blood and the shock. Chloroform sickness which supervened after the operation was subdued by a few fifteen drop doses of a 20% solution of cocaine.

The wound of the thigh having sloughed extensively, on January 10. Mr. Annandale tied the femoral artery at the apex of Scarpa's triangle so as to lessen the risk of secondary hæmorrhage. Three days afterwards signs of gangrene appeared in the calf of the left leg. The temperature ran up to 107° F. in the evening, and the patient became delirious. On the following day the gangrene having spread to the knee, amputation through the upper third of the thigh was performed. On January 15, at 1 A. M., a very profuse reactionary hæmorrhage, from a branch of the profunda artery having taken place, the patient was transfused by Dr. Darling, the blood being given by Dr. Thomson. Four ounces of blood were injected, together with two ounces of solution of phosphate of soda, and the condition of the patient at once began to improve. The patient being still very weak, and at times delirious, Mr. Annandale performed transfusion at midday, injecting six ounces of blood with two ounces of saline solution. Marked improvement again followed. On January 16 symptoms of septic absorption being present and the patient profoundly weak, transfusion, to the extent of six ounces of blood and two of the saline solution was again performed. The great improvement which followed was maintained for thirty-six hours; but on January 18 there was a falling off,

and transfusion was practiced for the fourth time. Seven ounces of blood and two of the saline solution were injected. About half an hour after the operation the patient had a rigor, and the temperature rose to  $106^{\circ}$ , but it rapidly fell to  $99.2^{\circ}$ , and the corpuscles were found in the evening to have increased by 250,000 per cubic millimetre since the morning. From this period convalescence slowly began. Several large pyæmic abscesses formed, and were opened in various parts of the body. The patient was discharged in very good health on April 9.

The author considers that the operation of transfusion is destined to hold a far more prominent position than it has hitherto done, owing to the fact that the method of application has been simplified and perfected. It is somewhat remarkable that the use of the saline solution, introduced by Dr. B. Hick in 1878, has not come into more general use, as it certainly deprives the operation, as usually performed, of most of its difficulties and dangers.

The author first employed it in Edinburgh about two years ago in a case of severe hæmorrhage from gastric ulcer, and was struck with the ease and safety of the method. The steps of the operation will be found recorded in the *British Medical Journal* of April 10, 1886. P. 697, to which description he wishes to add that the blood should not take more than five or six minutes to inject, though it does not coagulate before twenty minutes at least in the majority of cases; and that this operation, like all others, should be done with such antiseptic precautions as commend themselves to the common sense of the operator.  
—*British Med. Jour.*, Oct. 2, 1886.

H. PERCY DUNN (London).

#### GYNÆCOLOGICAL.

I. Subserous Papillary Cystomata of the Ovary; two Cases, the one being a Tubo-Ovarian Cyst. Ovariectomy in both Cases followed by Recovery. In one Case for Internal Strangulation Laparotomy four Months later. Recovery. By Dr. F. LANGE (New York). Both of these cases had this in common, that the tumour was of moderate size, situated on the right side, and rested with broad base between the layers of the broad

ligament covered by peritoneum, without in any way showing the formation of a pedicle.

In both the internal surface of the sac showed papillary formations, which in the one case were very numerous and well developed, so that in some parts they gave to a large extent to the inner surface a papillary aspect. Both cases were operated in such a way that the tumour was gradually shelled out of its peritoneal covering under due consideration of preventing hemorrhage by mass ligatures. In one case the peritoneum was thin, and could only incompletely be preserved. In the other it was fastened to the lower part of the abdominal wound, and the parietal peritoneum in such a way that the peritoneal cavity was entirely shut off. In the other this peritoneal partition was incomplete. In both cases the wound surface in the depth of the peritoneum was filled loosely with iodoform-gauze, which was removed on the second or third day to be replaced by less gauze and finally a drainage tube. In this way gradual diminution of the cavity took place, but in one of the cases, where the closure had been imperfect, a fistula has remained, through which so far some coarse silk sutures have been discharged and more are to come out. The patient moves about without much discomfort. The specimen of this latter case presents the rare variety of tubo-ovarian cyst, the fallopian tube being in free communication with the inside of the cystic sac. Its canal was found dilated, the mucous membrane hypertrophied, and the contents a bloody mucus. The content of the cyst itself at a puncture several months previous to the radical operation was clear, yellowish and thin, containing a great deal of cholesterin crystals.

The other case had the following interesting history. The patient, after having recovered from the operation sufficiently, went to the Catskill mountains. She was then suffering from unmistakable tuberculosis of the lungs. About four months after the operation she developed symptoms of obstruction of the intestine suddenly, apparently after an indigestion. At the end of three days, when first seen by Dr. L., the obstruction was complete and stercoraceous vomiting had occurred repeatedly. Without much delay the patient was brought to New York, and after the stomach pump and carbonic acid enemata had

been tried without success, laparotomy was done on the evening of September 17. The obstruction was due to constriction of a loop of intestine about the size of a duck's egg by a sharp peritoneal band which spread between two points near the attachment of the mesentery to the small intestine. Under this band a coil of intestine had apparently slipped, and was so tightly strangulated, that it looked almost gangrenous. Around it there was a small gathering of brownish bloody fluid, just as we find it in cases of strangulated hernia. There was no connection with the original field of operation. The peritoneal sac, remaining after the ovariectomy, had shrunk to a small, hard lump. Some adhesions of the omentum to it were removed. Numerous tubercles were found to be spread over the peritoneum, also one larger, cheesy nodule within the omentum.

No disturbance followed the operation from the side of the abdominal cavity. The function of the gut returned about forty-five hours after the operation, and has since then remained normal.

During the second week, however, the lung trouble became more serious and the formation of a cavity in the right upper lobe of the lung could be clearly made out. The present condition of the patient now, four weeks after the operation, is tolerably good, though there is no doubt that finally she will die from tuberculosis.—*Proceedings New York Surg. Soc.*, Oct. 11, 1886.

**II. Six Cases of Abdominal Section for Pyosalpinx of Gonorrhœal Origin.**—By JOSEPH PRICE, M. D. (Philadelphia). In the belief that they show beyond doubt the causal relation between the diseased condition of the tubes and ovaries and a previous gonorrhœa, the writer presents the following cases: 1. History of a past attack of gonorrhœa with present symptoms of trouble in the ovarian region; on examination, the right ovary was found to be enlarged and its tube, large, distended, tortuous and firmly adherent. Abdominal section revealed large adherent ovaries and tubes filled with pus and removed with great difficulty. They were enucleated and the patient made a speedy recovery. 2. Clear history of specific trouble with ovarian pain and general debility: examination showed the left tube distended

and closely attached by its lower border to the broad ligament: the ovary was large, and both it and the tube were extensively adherent to the pelvic viscera. On abdominal section, a large tube filled with pus, together with a cystic ovary was removed, the pavilion of the tube containing pus sacs from which leakage had probably occurred into the peritoneal cavity. Recovery was rapid. 3. A prostitute in whom the uterus was small and pushed forward by large tortuous and distended masses, situated posteriorly on the right and left. Abdominal section revealed a large tube containing purulent cheesy matter, and many strong adhesions, which rendered it impossible to remove the right ovary: although amid the most filthy surroundings, the patient made a good recovery, with the exception of a small sinus, probably leading to pus pockets connected with the other tube or ovary. 4. History of active gonorrhœa and symptoms of ovarian or tubal trouble; examination showed both ovaries enlarged, with a tortuous irregular tube down in the retro-peritoneal pouch, with extreme tenderness, showing probably pyosalpinx. On abdominal section, both tubes were found filled with pus and both ovaries cystic, and were removed. The adhesions were strong and intimate. A tear of all the coats of the intestine except the mucous, made in detaching the right tube and ovary, was sutured and did not interfere with an uninterrupted recovery. 5. History of gonorrhœa, examination showing the right tube and ovary to be diseased and general peritonitis to exist. The cylindrical, tortuous and sausage-like tube, boggy to the touch, was enucleated with difficulty, owing to the strength of the adhesions, and there were small necrosed points from which constant leakage had taken place. Patient did well for a while, but finally died owing to the neglect of her nurse. 6. Constant discharge and pelvic pain for a year, and, on examination, hard, firm, irregular bodies extending from the right and left posteriorly. Abdominal section showed the inlet of the pelvis choked by adhesions, and the tubes and ovaries firmly adherent to the surrounding pelvic viscera; left tube tortuous and filled with pus and both tubes and ovaries required complete enucleation; recovery in a month.—*N. Y. Med. Jour.*, Oct. 23, 1886.

JAMES E. PILCHER (U. S. Army).



## REVIEWS OF BOOKS.

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HOW WE TREAT WOUNDS TO-DAY. A treatise on the subject of anti-septic surgery which can be understood by beginners. By ROBERT T. MORRIS, M.D. Second edition. 12 mo. P. 165. New York and London: G. P. Putnam's Sons. 1886.

This little book has evidently been written with a purpose; it is both a missionary tract and a primer of antiseptic technique. There is, withal, a breezy dogmatic flavor to its sentences that will not fail to attract attention to what is said, whether it commands assent or not. It is not an elaborate treatise on the treatment of wounds, nor a description of the many varieties of antiseptic technique that are in vogue. The author is very plain and detailed in what he does say, and the very limitation of his directions to one line really increases the value of his book to those who wish to know just what to do in order to conform their work to the demands of the most approved antiseptics. The methods detailed are those which are to be found in the best of the German clinics at the present time, and which look to the obtaining of aseptic wounds and infrequent dressings. Full descriptions of all materials required for this kind of work, how to prepare them or where to obtain them, as well as how to use them, are given. The book will do much to popularize thorough antiseptic wound treatment. There is so much of superficial, so-called antiseptic work being done, that such a clean-cut, positive detailed setting forth of what constitutes real antiseptic work, as this is, is called for.

L. S. PILCHER.

DIE ASEPTISCHE WUNDBEHANDLUNG IN MEINEN CHIRURGISCHEN PRIVAT-HOSPITALERN. Von Dr. G. NEUBER, Docent für Chirurgie a. d. Universität zu Kiel. Kiel, Lipsius und Tischer. 1886. New York, G. E. Stechert.

Aseptic Wound Treatment in my Private Surgical Hospitals. By Dr. G. NEUBER, Instructor of Surgery at the University of Kiel.

In this pamphlet of 36 pages, the former assistant of Prof. Esmarch, of Kiel, relates his efforts to replace the present method of antiseptic treatment of wounds by simple aseptic treatment.

Believing wound-diseases to be caused by the action of germs, he seeks to avoid their presence by a general improvement of hospital hygiene, rather than by locally combatting them with antiseptic solutions and materials.

The work is of interest as it is the first one of its kind, coming from a German surgeon, while our own literature offers a relatively large number of similar propositions. No results are as yet recorded—the buildings and internal arrangements having scarcely been completed. A detailed description of the three separate hospital buildings and accessories is given, illustrated by numerous wood-cuts: and in the account of the operating rooms many hints are interspersed, which are well worthy of attention.

We notice a few of them more particularly. The operation rooms, which are situated on the ground floor, are five in number; a separate room being used for the treatment of acutely inflamed, chronically inflamed and recent wounds, injuries not complicated with wounds, and rectal and genito-urinary diseases respectively. Each room possesses its own proper instruments and paraphernalia.

The walls, ceiling and floor are all smooth and coated with oil-paint, so as to be easily cleansed, and much of the stationary furniture, etc., is let into the walls.

The floor slopes to a drainage-hole at one side, which leads through a tube directly into the outer air. From the end of this tube the waste fluids fall into a receiving funnel, from whence they are conducted by pipes to the sewer. By this arrangement the author hopes to escape the effects of sewer-gases. The other waste-pipes of the house are simply trapped with water.

The air admitted to the operating room passes first through a furnace and then through a cotton filter.

The author intends to use only sterilized water for irrigations. He places his instruments in a 1% carbolic solution, after boiling them for fifteen minutes. He gives the greatest attention to the personal cleanliness of all the attendants, and has all articles of furniture as well as the aprons and boots of the surgeons soaped off and cleansed with sublimate solution (2 pro mille.). The sponges, after having been thoroughly cleansed, are kept in a 5% carbolic solution.

Separate bath-tubs are provided for patients affected with different diseases, septic infections being prevented from all contact with recent wounds. The skin is disinfected before operations with sublimate solution.

By such means as these—though they can scarce claim the title of simple aseptic as opposed to antiseptic precautions, as the author would have it, Dr. Neuber hopes to do away with the drainage of wounds altogether, to avoid changing the dressings and to escape all dangers of poisoning by antiseptic substances.

W. W. VAN ARSDALE.

*PATHOLOGIE UND THERAPIE DER SEITLICHEN RUECKGRATSVERKRUEMUNGEN.* Von Dr. Adolph Lorenz, Docent für chirurgie, etc. Vienna, 1886. Alfred Hölder. New York, G. E. Stechert. (Pathology and Treatment of Lateral Curvature of the Spine.

The book appears in large octavo, containing about 200 pages of text, and is handsomely illustrated by means of nine lithographic and eleven photographic plates.

About one-third of the bulk of the book is devoted to the pathological and theoretical aspect of the subject of scoliosis, and about one-fourth each to the clinical side of the subject and to treatment.

The author admits a torsion of the spinal column in scoliosis (*contra Nicoladoni*), but does not believe that such torsion is produced by a relative rotation of the bodies of the vertebræ upon each other (since no alteration of the articular surfaces is to be observed), but maintains that the column is rotated as a whole.

Theories to account for the manner in which the rotation originates, as advanced by H. von Meyer, Drachmann, Schenk and others, are refuted. The author believes that when the bodies of the vertebræ are forced to one side in consequence of pressure from above, the vertebral arcs do not participate to the same extent in the motion, but are, as it were, left behind.

Anatomical changes occurring in the ribs, the sternum, the thorax, the pelvis, the ligaments and muscles of scoliotic individuals are separately described.

As to the theories of the genetic origin of scoliosis, the author first refutes, both anatomically and clinically Eulenburg's theory, (that the relaxation of the hyperextended muscles on the convex side of the curved spine cause the disorder), and sharply criticises Hüter's hypothesis of the pressure of the ribs during the growth of the parts. He also attacks other less recent theories relating to muscular action, as well as that of Lorinser, who believes scoliosis due to some insidious otitis. The so-called physiological scoliosis he believes to be an optical delusion referable to the flattening of the left half of the bodies of the middle thoracic vertebræ.

To Roser and Volkmann he gives the credit of having first thrown light upon the subject of scoliosis, by adducing static moments, and thus originating the theory of pressure by weight in habitual scoliosis, which he explains at length.

In the clinical portion of the work we find chapters on the symptomatology of typical forms of scoliosis, on the relative frequency of these different types, on the clinical course of the disease, and on the methods of the clinical examination of patients. As to the notation of results of

such examinations the author prefers the combination of photographic views of the back, and the data obtained with the help of Mikulicz's measuring apparatus and the lead wire.

Chapters descriptive of the static, rhachitic and other forms of scoliosis are given, and a practical one on the prophylactic treatment of the deformity in which the author describes a novel school-bench.

Under the heading of treatment, the author expresses himself as not in favor of Swedish movements for scoliosis, since he does not agree with Eulenburg's myogenetic theory. Sayre's treatment is extensively commented upon; in the author's opinion suspension alone is insufficient to correct the existing deformities, and therefore the corset is too ineffective, especially as it prevents correction of the position of the ribs. Poroplastic felt is condemned as not sufficiently easily applicable.

The antistatic method, consisting in the use of an inclined seat, etc., is not suitable for the correction of thoracic forms of scoliosis,

The author's method of treatment of lateral curvatures of the spine consists in a combination of forced corrections (*redressement*) of the position of the parts, together with the use of a removable plaster-of-Paris corset between the sittings. A cushioned wooden cylinder is fixed horizontally at a height corresponding to the axilla of the patient (supposed to be suffering from a deviation of the spinal column, in its thoracic portion, to the right side), and over this support the patient bends backwards and laterally, in such a manner that the cushion presses upon the prominent portion of the thorax at a point where the diagonal axis of the chest emerges, and in such a posture that the support is at right angles to this axis. The patient grasps a strap attached to the floor, with her left hand raised above her head. By pulling on this strap she can raise her feet from the floor, and the whole weight of the body now rests on the support, while the weight of the lower extremities (augmented, if need be, by suitable weights) tends to correct the compensatory curvature of the lumbar portion of the spine. This exercise he calls lateral suspension. In applying the plaster-of-Paris corset the author endeavors, by padding it in certain places with pieces of felt, to compress the thorax diagonally, sufficient room being maintained to permit a proper expansion in a plane situated at right angles to the one of compression. The author also makes an extensive use of narrow plaster-of-Paris jackets or belts, by means of which he endeavors to obtain a lateral shifting of the entire upper body on the pelvis, as it were.

These bandages are applied while the patient assumes certain appropriate positions, extension apparatus, lateral traction, etc., being frequently made use of.

In addition the author gives a number of his cases, illustrated by photographs, which, it must be acceded, show very good results.

W. W. VAN ARSDALE.

ON CANCER OF THE MOUTH, TONGUE AND ALIMENTARY TRACT. THEIR PATHOLOGY, SYMPTOMS, DIAGNOSIS AND TREATMENT. By FREDERIC BOWREMAN JESSET, F.R.C.S. Eng., Surgeon to the Cancer Hospital, Brompton. Octavo. pp. 302 London. J. and A. Churchill. 1886.

As the introduction states, the object of the author in writing this book is to collect the more recent information on the subjects treated of, and to contrast the experience of other surgeons with his own at the Cancer Hospital, Brompton. Although nothing new has been attempted, Mr. Jesset has succeeded in presenting a clearly written and judicious résumé of our knowledge of the subjects which he has undertaken to discuss. Where so much literature has to be read on every subject, a reliable work, such as the present, is of much service, and enables those in busy practice to keep abreast of the advances of the day.

The contents are divided into nine chapters with the following heads: Cancer of the Lips; Cancer of the Gums and Antrum; Cancer of the Jaws; Cancer of the Tongue; Cancer of the Tonsil; Cancer of the Pharynx and Œsophagus; Cancer of the Stomach; Cancer of the Intestinal Canal, and Cancer of the Rectum and Anus.

It is unnecessary to review at length the contents of each chapter as it is equally true of them all to say that they give a full and careful digest of the pathology, symptoms, diagnosis and treatment of the cancerous affections in each case. Statistical tables on questions of importance are quoted from various writers, and similar ones have been compiled by way of contrast from the records of the the Cancer Hospital. The latter tables, however, do not seem to differ in any essential way from those previously published, but in so far as they confirm them they are of value as pieces of corroborative evidence.

A number of important cases are narrated at length at the end of the book. These have been selected from published records and from the author's case book and exemplify the text.

A good index makes a reference to any part of the contents at all times easy.

The spelling of Kocher's name as Kocker is a mistake which has been carried throughout the book. This, along with certain other typographical errors, will doubtless be remedied in a future edition.

The practical experience, wide reading, and judicious selection manifested in this work cannot fail to be appreciated.

CHARLES W. CATHCART.

# ON THE MEANING OF THE "REVERSE" IN BANDAGING.

By CHARLES W. CATHCART, F. R. C. S.

OF EDINBURG.

ASSISTANT SURGEON, EDINBURG ROYAL INFIRMARY.

ALTHOUGH numerous treatises have been written on the subject of bandaging, and although many directions are to be found on the methods of applying particular forms of bandage to various parts of the body, one seldom finds a reference to any first principle that may underlie the rules for the mechanical procedure.

Most authorities start with the primary objects of a bandage, proceed to state that a reverse must be made while a bandage is traversing a cone and a figure of eight where two cones meet, and then give directions necessary for applying the bandage to each part of the body. This is, of course, all that is absolutely necessary. But it leaves in many minds the unsatisfied feeling of not knowing why, which it is well, so far as possible, to avoid. While a student under Mr. (now Professor) Chiene, my attention was first directed to this subject, and the admirable principles which he laid down as applicable to all forms of bandage have proved of great service to me ever since. These, I understand will be incorporated in a book shortly to be published. My object at present is to develop a particular branch of bandaging principles, an explanation of which I have hitherto been unable to find.

The question which never seemed to me to be answered was "why do we make a reverse while bandaging a cone?" Simple though the matter may be, it seems at least worth while to try to explain it. All authorities allow that certain parts of the limbs are conical in shape, and certain others cylindrical, while at given places two cones meet, either with their bases



or with their apices in contact. Again, uniform tension producing uniform pressure is generally allowed to be one of the main features of a well applied bandage. Let us therefore start with that factor, *uniform pressure*, applied with a *bandage* to a *cylinder*, *cone*, or *junction of cones*.

If we consider a bandage as a strip of cloth of equal breadth throughout, whose edges are generally somewhat frayed, and therefore slack, we see that there is a good reason for the rule that every turn of a bandage must overlap the previous one. Otherwise, if the edges were only just in contact, however accurately, the parts of the limb beneath the middle of the bandage would be more firmly pressed upon than those at the margin. The object of the overlapping will therefore be to make up by the double application of the slacker parts at the edges for the greater firmness of the more tense portion in the middle. But to insure a uniform pressure, the edges must not only overlap, but overlap as nearly as possible to the same extent, hence each overlapping turn must have its edges parallel to those of the previous turns. There must, however, be also another element in the bandage: its surface must lie flat; and so, as the overlapping is dependent upon the parallel arrangement, we may take the two essential elements of bandage application to be

1. That the surface of the bandage must lie flat.
2. That its edges must be parallel in each successive turn.

Can we carry this out in a cylinder? If we try, we shall find that we can. At whatever angle to the long axis of the cylinder the bandage is applied, the surface of the bandage can always be kept flat, while the successive turns are also parallel. This is because each turn is exactly like the previous one, and the distance traveled by each edge of the bandage is always the same. With a cone, however, the case is quite different. Here while the length of the two edges of the bandage remains constant, the distance which each has to travel in order to encircle the cone is always different. Suppose we try to traverse a cone with, say, its apex downwards, as from above the ankle to the calf of the leg, and let us call that end of the bandage next the thicker or base end of the cone the upper edge, and

the other the lower edge. Then if we carry the bandage round the cone, at any angle to its axis, the upper edge will be tightly applied while the lower edge is slack, having a less distance to travel. We may, if we please, make successive turns, keeping the edge of each parallel to the previous one, but as we do so we shall fail to carry out the first essential of the bandage, *i. e.*, its surface will not lie flat to the cone. If now we determine to keep the edges of the bandage equally tight and the surface flat, as we go on we must be constantly drawing on the lower edge, which has a less distance to travel, more than on the upper, and so be forcing the bandage to take a constantly increasing helix course (or thread of a screw with constantly increasing distance) until it ceases to pass round the cone at all and runs toward the base. In other words, the edges cannot be kept parallel. We therefore see, when we try to bandage a cone as we would a cylinder, that if we keep the edges of successive turns parallel, the surface will not lie flat, and that if we keep the surface flat, the edges will not remain parallel. Now it is just at this stage that the reverse comes in to help us. After a single turn—which as we have seen must be part of the thread of a screw—we reverse the edges of the bandage by folding them over, and so likewise alter the direction of the bandage. This undoes the disturbing effect of the cone, and so enables the successive turns to be practically parallel to one another, while the surface is also uniformly flat. The bandage is therefore folded over and over upon itself in the same way, the edges becoming alternately upper and lower at each turn. Since the tendency is to run towards the base, the reverse will always be toward the apex. It will further be easy to see that the steeper the slope of the cone the more abrupt will be the fold of the reverse.

But the explanation of the simple reverse carries with it also that of the figure of eight where two cones meet with their bases together, as well as that of a combination of turns and reverses on a single cone to which it is difficult to give a name. (In Edinburg it is generally known as Dr. P. H. Watson's bandage).

As to the figure of eight, I should like to premise that the

term is used in two senses, sometimes in the strict sense, where there are two series of single loops, as in a spica at the ankle, groin, or shoulder, sometimes, however, where there is a complete turn given in addition to each loop, as may be done at the calf of the leg. The explanation, however, is the same in either case. It is simply this, that when the bandage has made a turn round the cone so that a reverse becomes necessary, the same effect as the reverse can be produced by carrying the bandage round a cone sloping in the opposite direction to the first. When this has been done, either a reverse can be made on the second cone, or the bandage can be brought back to the first cone, where it will now be ready to make a flat turn with its edges parallel to those of the last turn on this cone, and so on. Where the edges of opposing cones are pretty steep, or where a considerable distance has to be travelled, a single loop is sufficient to produce the desired effect, but where the slope is more gradual a complete turn will be required in addition. Again, where the slopes are different, a single loop might suffice for the steeper cone, while the additional turn is required for the other. It will be evident that the figure of eight method will only be applicable to the case of two cones with their bases together, because the tendency of the bandage is always toward the base of the cone, and thus toward the other cone, and not away from it as would necessarily be the case were the apices together. Finally it will be evident that this must be a secure method of bandaging, because the tendency of the bandage to slip from the broader to the narrower part of each cone will be always resisted by the turn round the opposite cone.

With regard to the combination of loops and reverses on a single cone, we must imagine a loop having been made, and the bandage carried up as if to go to the opposite cone, there being none, a sharp reverse is made instead, and the bandage is again brought back to make a loop as before. This method, of course, involves numerous turns over the same part, but such may be looked upon as the leading feature of the method when it is thought advisable to employ it.

I trust that the simplicity of the subject of this paper may not prevent it from helping to improve the ground work of the art of bandaging.

## NOTE ON AMPUTATIONS FOR JOINT-DISEASE WHEN LUNG TUBERCULOSIS COEXISTS.<sup>1</sup>

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THE frequency with which tuberculous joint affections are complicated with tuberculous diseases of the internal organs, is such as to make the question of their mutual reaction one of importance.

Willemer, in his report on the results obtained in tuberculous disease of the knee-joint by König at the Göttingen clinic, during the seven years ending October, 1882 (*Deutsche Zeitschrift f. Chirurg.*, Bd. 22, Hefte iii. und iv.; *ANNALS OF SURGERY*, 1885, vol. ii. p. 514), states that of 174 cases operated upon, 15 per cent. of those below 10 years of age, 20 per cent. of those between 10 and 20, and 37 per cent. of those over 20, were complicated with tuberculous diseases of internal organs. Volkmann, in his address on tuberculous surgical affections, at the German Surgical Congress of 1885, said "Local tubercular disease of other organs combines far more rarely in children than in adults with fatally progressing lung tuberculosis. In an older individual, having—*e. g.*, caries of the wrist, it is exceptional that he does not have or is not soon attacked by pulmonary tuberculosis." Vincent, of Lyons, in his article on scrofulo-tuberculous diseases of the knee, in the *International Encyclopedia of Surgery*, vol. vi., p. 925, speaking of the results of a general scrutiny of patients affected with tubercular osteitis, or osteo-arthritis, says "Too often there are found manifest signs of advanced pulmonary tuberculosis."

It is needless to multiply authorities or observations for the

<sup>1</sup>Read before the New York Surgical Society, November 22, 1886.

purpose of emphasizing the frequency of the co-incidence of tuberculosis of internal organs with knee and joint disease of like character. The question which I wish to submit for consideration in the present note is, What modifying influence, if any, should the coexistence of an actively progressing lung tuberculosis have upon the operative measures which shall be adopted in the treatment of tuberculous joint affections? How is the lung tuberculosis likely to be affected by the operation upon the extremity? What disturbance in the repair of the operation wound in the extremity is likely to arise from the coexistent pulmonary trouble? Is it worth while, in the presence of an affection of an internal organ, which with great certainty entails a fatal termination, to subject a patient to the traumatism required to rid him radically of a local affection of an extremity?

A case in point is the following:

In January, 1879, nearly eight years ago, I first was consulted by a lady, then *æt.* 37, on account of slight lameness of the right knee. There was a tenderness on pressure on the internal condyle of the femur with some puffiness of the overlying soft tissues. In the preceding March she had slightly bruised this knee, the injury being so insignificant that it was not considered worthy of attention until the subsequent increasing lameness compelled attention. The father of the patient, and a maternal uncle, had both died of tuberculosis pulmonalis; and at the period of the injury and during the subsequent years, the patient was suffering a severe strain upon her constitutional vigor through domestic afflictions and deprivations. It was impracticable for her to give to the limb the rest required for its proper treatment, and I shortly lost sight of her. Three years later, June, 1882, I saw her again, when she consulted me on account of persistent cough, with debility and loss of weight. Physical examination revealed a deposit at the apex of the left lung. Her knee was still troubling her some, but she was able to walk about without any marked limp. In the interval that had passed, she had had two attacks of acute synovitis of the affected knee. Under treatment during the summer and autumn, a markedly progressive improvement in her cough and in her general health took place, but her lameness increased, with periarticular muscular rigidity and nocturnal spasms, followed by a renewed acute synovitis. Immobilization with extension

was instituted, and finally, pus having been demonstrated by the aspirator, free incision into the joint with antiseptic irrigations were made. The joint suppuration soon ceased under this treatment; the wound healed, and wearing an immobilizing apparatus, the patient was able to be around upon crutches during some months. An attempt to gain increased freedom of use was then followed by a renewed acute suppurative attack, which persisted despite antiseptic irrigations and drainage as before. The pain and loss of sleep combined with the discharge to sap the patient's general strength. Meanwhile the dormant pulmonary trouble was reawakened, and the general symptoms, as well as physical examination, indicated a rapidly progressing lung tuberculosis present.

In this case the aggravated character of the suffering caused by the knee-joint affection, together with the depressing effect of the confinement to the bed which it necessitated, determined me to undertake a radical operation for the removal of the parts involved in the joint affection, despite the extent and activity of the lung disease.

Perhaps the most important guide to the surgeon's action is to be found in what is suggested in the remark just made. Any possible remote unfavorable influence upon the lung affection that an operation might entail, or any possible disturbance of healing that might later affect the operation wound is thrown into the back-ground by the more immediately pressing necessity of relief to the present suffering, which the knee and joint affection is inflicting. In a condition such as I have described, the joint affection constitutes an acutely urgent condition, the indications for the relief of which are of supreme importance.

Accordingly, in the case under consideration, I proceeded to operate in August, 1884. The joint was opened by the usual anterior semi-lunar incision as for exsection; the articular surfaces of the femur and tibia were found extensively eroded, the crucial ligaments had disappeared, and the whole of the exposed surface was soft and friable. Upon attempting to apply the sharp spoon to it, the instrument passed almost without resistance for some distance up the shaft of the knee into a caseous mass. The evident tuberculous degeneration of the lower end of the femur was so extensive that complete removal of all the affected tissue by excision was out of the question. I therefore proceeded to amputate, making the section of the femur at about its



middle third. The local result was all that could have been wished; healing *per primam* throughout most of the wound was effected. A simple small sinus persisted for some weeks, but finally spontaneously closed. In three weeks the patient was able to leave her bed, and soon resumed the direction of her household affairs. The effect upon the lung tuberculosis was also very marked; the activity of its further progress was greatly hindered, cough diminished, appetite improved, and general strength increased. Two years and three months have now passed since the amputation, and the patient is still living, though she is far from being a well woman; being distinctly tuberculous, with cough, dyspnoea on exertion, and general debility. No extension of her lung trouble, however, has been manifested up to the present date. The stump is firm, and free from any signs of tubercular degeneration whatever.

In connection with this case, I would like to cite two cases which were embodied in a memoir by Dr. Mabboux, of Lisle, and commented on by Dr. Chauvel at the meeting of the French Surgical Society of February 10, 1886. In the first case, tuberculous caries of the metatarsal bones of a young soldier having been treated by *reséction*, there followed synovitis of the periosteal sheath, and later, suppuration of the tibio-tarsal articulation and concomitant pulmonary tuberculosis. After three months, all the symptoms continuing to be more unfavorable, the foot was amputated; rapid cure followed; the pulmonary symptoms abated, and, finally, disappeared, and robust health was regained.

In the second case, likewise in the person of a young soldier, suppurating knee-joint disease and beginning pulmonary tuberculosis coexisted. Arthrotomy was done, the pus evacuated, the fungosities removed, and the denuded bone scraped; this was followed by redoubled suffering, probable meningitis, and more pronounced pulmonary symptoms. At the end of a month the pain was atrocious, emaciation extreme, the exhaustion almost complete, and early death certain. At the earnest wish of the patient, and in spite of the gravity of the condition, amputation of the thigh was done. Great improvement followed for one month, then the stump ulcerated, fever reappeared, tuberculosis of the abdominal viscera de-

clared itself, and, finally, death at the end of four months after the amputation, but no recurrence of the intense suffering for which the operation had been performed.

In the discussion which followed M. Chauvel's report, a number of additional cases were adduced in which either apparent complete recovery, or great improvement in a lung tuberculosis had followed amputation for coexisting joint disease. All, however, were not ready to accept the tentative proposition of Chauvel, that local tuberculosis, as in osseous and articular affections, is to be considered as a neoplasm, the more malignant from its tendency to generalization, and to be treated under the same rules as sarcoma and carcinoma; and that early amputation is indicated whenever the extirpation of the disease in place is impossible, or when the anatomical conditions do not permit the complete and certain ablation of all the infected tissues.

Without attempting any elaborate discussion of the many phases which are presented by coexisting lung tuberculosis and osteoarthritic tuberculosis, the materials for which have amassed in great abundance during the last few years, I desire to close the present brief note by the following theses, which seem to be in accordance with present experience.

1. The probabilities of a spontaneous cure, or prolonged abeyance of a tubercular bone or joint trouble, as a result of expectant and palliative treatment—*e. g.*, improved hygiene, rest, counter-irritation—is much greater in children than in adults.

2. The probability of the presence or early development of lung tuberculosis in case of tubercular bone and joint affections, is much greater in adults than in children.

3. Incomplete operations, as drainage and irrigation of joints, *évidement*, and resections in which all of the diseased tissue is not removed, are less likely to be followed by ultimate good results in adults than in children.

4. Operative interference of a radical character is justifiable at an earlier date, in the history of a bone or joint tubercular affection, in an adult than in a child.

5. When a lung tuberculosis is present, and an operation for

the relief of a coexisting bone or joint affection is indicated, as the result of such operation, the lung affection, while in some cases influenced, is more frequently temporarily checked in its progress, and in some instances is apparently entirely removed.

6. Local relapse after an operation for an osteo-arthritic tubercular disease, lung tuberculosis existing, is exclusively conditioned upon incompleteness of the operation—the fact that somewhere tubercular tissue escaped removal—and not upon any influence exerted by the lung affection.

7. In any case of osteo-arthritic tuberculosis demanding operation, in which a doubt exists as to the possibility of removing absolutely all the diseased tissue by the more conservative methods of arthrectomy or excision, the coexistence of lung tuberculosis would be a circumstance that would add weight to the reasons for having recourse to the more radical operation of amputation.

8. After an amputation in perfectly healthy parts, as prompt healing may be expected in persons suffering from lung tuberculosis, as after such an operation in a healthy person. Relapses at the stump do not occur even in persons with advanced lung disease.

## ABNORMALITIES OF THE URACHUS.

By JAMES A. FREER, M. D.,

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ABOUT the twentieth day after conception, as the development of the ovum is progressing, and the blastodermic membrane is undergoing its successive primitive changes, there is developed from the entoblast and the internal layer of the mesoblast a transitory foetal structure, which appears first as two small tubercles that appear toward the caudal extremity of the foetus; these coalesce in the course of a few days forming a large central cavity; this is the allantois; it grows rapidly until it comes in contact with the most external of the ovular membranes, the chorion, whither it conveys the foetal vessels, which are in turn distributed to the villi, thus establishing communication between the foetal and maternal circulation.

This structure is at first spherical in form, next it becomes pyriform, then by a process of central constriction it becomes divided into two parts, which have free communication with each other through the constricted portion; the function of the larger of these which becomes blended with the chorion we have already briefly noticed; the smaller is destined to become the urinary bladder of the matured foetus. The allantois has now fulfilled its function, and completed its existence. The constricted portion of it enters into the formation of the umbilical cord and the urachus, and it is the abnormalities, congenital and acquired, of this last structure, to which it is the aim of the present paper to direct attention. After the period to which it has now been traced, instead of remaining a pervious tube in the normal foetus, it shrinks and becomes a fibrous cord, and continues its existence as the suspensory ligament of the bladder, being attached above at the umbilicus and below to the fundus of the bladder, just anterior to the reflec-

tion of the peritonæum, to the base of that viscus.

Already at the end of the seventeenth century Peyer maintained, in opposition to Caspar Bauhin and Regner de Graff, that the urachus was pervious during the foetal period. J. G. Walker (Annotations Acad. Berol, 1775) tried to prove that the urachus was formed by a continuation of the mucous membrane of the bladder, being in its healthy natural state a pervious canal in every period of life, in both sexes, which admitted of the passage of a small probe or of mercury. Ruysch and Hildebrandt also agree to its being a hollow canal. C. H. Weber believes it to be a continuation of the vesicular mucous membrane. Luschka's recent anatomical and microscopical investigations of the urachus of adults on the male body demonstrate that at least in the majority of individuals, it is at least partially hollow, being lined, as claimed by Walters, by a mucous membrane, though it does not always communicate with the bladder. In many cases he has found the membrane of the bladder to continue in a tubular prolongation from the base of that organ along the urachus. A small opening of about the size of a needle has been observed in the bladder, usually, however, only a small indentation, or no trace is visible. He also observed that where a cavity existed its lumen was not of uniform size, but consisted of a series of constrictions and expansions of varying shapes and sizes. These cysts are usually very small, rarely attaining a size greater than a millet seed or a small pea.

Huschke thinks that the urachus is connected with the bladder only through the muscular layers of the latter.

Meckel and Arnold hold that it (*i. e.*, urachus) is impervious and only occasionally found hollow.

According to other investigators it is obliterated towards the end of gestation or soon after birth. Several works on pathological anatomy mention the abnormal patency of the urachus among them are Foerster, Rokitansky, Voigtel and Klebs.

This perviousness exists with varying degrees of completeness, and is manifested by phenomena which differ widely in different cases. In some it affects only the lower portion of

the urachus, which is the seat of a *cul de sac*, varying in length from a few lines to several inches, while in other cases the urachus constitutes a canal reaching from the bladder below to the umbilicus above. The walls of this canal sometimes become distended so as to form cysts which occasionally grow to enormous size. To these farther reference will be made.

The next and last stage of completeness is seen when an opening exists at the umbilicus through which the urine sometimes passes. This constitutes a true vesico-umbilical fistula.

The cases that I have seen, two in number, were of the congenital variety and of the complete class, one was a male infant a few months old, and the other was a married lady, æt. about 40. The character of these cases had led me to the conclusion that the trouble was always a congenital one, and owing to arrest of development in the fœtus of the parts concerned; but while this is the apparent mode of origin in a large number of cases, it is not in all, for a considerable proportion of the reported cases are of the acquired variety; the subject of etiology is therefore of some interest.

No explanation of the source of this arrest of development, assuming it to be a cause, has within the circle of my investigation been proposed, it having in no case been traced to the mental influences affecting the mother, as have numerous other congenital abnormalities. The authors of the various reports of cases, seem to have avoided the subject of pre-natal causation, consequently but very little information on this point can be gleaned from them, but, from the few casual remarks which have escaped, and from the evidence contained in this condition of the patients with which I have been conversant, I feel constrained to class it with that innumerable category of ills resulting in some hidden way from what is known as the strumous diathesis. In further confirmation of this opinion, I will here quote a case of comparative pathology, which, if it may be accepted as evidence, will render more tenable the above theory. The following case is reported in the *Obstetrical Gazette* of Cincinnati of 1879, p. 100.

A colt which died a few days after birth from scrofulous osteitis, was found also to be suffering from patulous urachus. It



is known that in the foetal horse the bladder is elongated and extends from the pelvis to the umbilicus, the anterior extremity having a neck-like constriction; at birth it separates from its umbilical attachment, becoming transformed into a cul-de-sac, following which, it is gradually retracted into the pelvis, where it assumes the proportions found in the mature horse. In the case above mentioned, the bladder retained its umbilical attachment and remained pervious at that extremity. This condition is recognized by veterinary surgeons as being generally present in cases of equine scrofula. In these cases at least, the scrofulous taint evidently is a factor in the arrest of development.

In view of the numerous and grave manifestations of this disease on cell life in the post-natal period of the human subject, may we not reasonably conclude that it exerts an influence previous to birth in a manner to produce this arrest of development, knowing it to be the accepted source of various other abnormalities, resulting from deficiency in development. Of these cases the following are examples:

CASE I.—This patient is the infantile case above referred to. It was a male child only two or three months of age. He was presented at Prof. Helmuth's College Clinic in 1885 by its nurse, who declared that the child passed its urine through the umbilicus. Upon examination an outgrowth was discovered in this locality which measured about an inch and a quarter in length. This was hollow and was connected by a completely pervious urachus with the bladder, which fact was evinced by a continual discharge through it of urine, which excoriated the parts and rendered the child exceedingly uncomfortable. The method of treatment suggested for the deformity was ligation of the excrescence. but owing to the absence of either of the child's parents this was deferred, the operator choosing not to incur the risk without their consent.

CASE II.—Married lady, æt. about 40. Diagnosis *vesico-umbilical fistula*. This patient came under my care while resident surgeon at the Ward's Island Hospital; she complained of a chronic purulent discharge from the umbilicus by which she had become so much exhausted that she was scarcely able to walk. An examination was made, and a fistulous opening discovered at the umbilicus, of sufficient size to admit a uterine sound. A Sims' instrument was inserted, when it

glided in without obstruction to almost its full length ; by giving it lateral motion the cavity which it occupied was found to have a breadth of almost three inches in its widest portion. When the probe was removed, pus welled up from the opening, and by exercising pressure from below upwards several ounces were made to exude. The cavity was then washed out with a two per cent. carbolic solution, and it was not until the disproportion between the amount of fluid injected and that which returned was noticed that the true nature of the case was guessed. This was afterwards proven by the injection of a starchy solution, after which the bladder was emptied and the iodine test applied to the evacuated fluid, which yielded the characteristic appearance of the blue iodide of starch. She was put on a nourishing diet, and the indicated remedy was administered, antiseptic treatment being kept up topically the while, and in a short time the purulent discharge ceased and the fistula closed spontaneously. She stated that the same result had been achieved at other hospitals previously, after which the fistula would remain closed for a short time, when it would reopen with a repetition of the above symptoms. Sometimes when straining and under other circumstances urine would be forced up through the opening, but this was so infrequent that she considered it of slight importance. No difficulty was experienced in passing the urine by the natural channel, contrary to the rule where the urachus is pervious.

The third and last case that I will mention in corroboration of this theory of antenatal causation is the following :

A divinity student, Herman R., had from his infancy been remarkable for a large abdomen, which had made him the subject of much ridicule among his playmates. Thinking adipose tissue to be the cause, he had tried to reduce it by fasting, but without avail. It caused him no trouble until his twenty-fourth year, when a marked increase in size took place, which seriously impeded his respiration. This led to an examination which revealed fluctuation in and around the umbilical region. The dyspnœa increased to such a degree that relief became imperative ; accordingly, a puncture was made, penetrating the walls of the fluctuating mass. This was followed by vomiting and intense abdominal pain. A considerable quantity of reddish, yellowish fluid was discharged. This measure afforded him relief, and, with the exception of occasional fainting spells, his health remained good for a period of two years, after which his abdomen again commenced to increase in size, dyspnœa also recommenced, and his general appear-

ance became cachectic. He again entered the hospital, where his medical attendant concluded to withdraw the fluid, the presence of which was made obvious by a congeries of symptoms similar to those above related. A puncture was again made, through which was discharged about six litres of sanguineous fluid. The operation was repeated three times during the ensuing nine months, the remainder of his life, the fluid drawn off measuring respectively eighteen and three-fourths, seventeen, and six litres. At his death he weighed one hundred and ninety-two pounds. The post-mortem contents of the cyst measured fifty litres, amounting in weight to about one hundred pounds. A minute examination of the cyst walls showed them to consist of three layers, the external being a serous coat. This rested on a layer composed of elastic and fibrous tissue, which was lined with pavement epithelium. The bladder contained a little yellowish urine. It was contracted and its lining membrane pale. The urachus was found closed at its vesicular termination; along its course towards the umbilicus, below the commencement of the large cyst, a small cyst existed; near the umbilicus the fibrous tissue of the urachus passed into the subperitoneal coat of the larger cyst which occupied almost the whole abdominal cavity.

These patients were all of a decidedly scrofulous habit. These cysts sometimes form and increase as the fluid accumulates within until the internal tension is greater than the walls can bear, and rupture ensues. This generally takes place at the umbilicus, the cyst contents being discharged externally, but sometimes the rupture is internal where the extravasated contents set up a peritonitis which is likely to terminate fatally.

A typical case of rupture at the umbilicus is mentioned by Dr. Helmuth in his *Contributions to Gynæcological Surgery*, page 116, a full account of which will be given later.

The following case from the *Dublin Journal of Medical Science* is illustrative of rupture internally, and shows the danger of such an issue:

CASE: A boy, æt. 10, was admitted into the hospital suffering from incontinence of urine and frequent attacks of hæmaturia. An analysis of his urine showed it to be alkaline in reaction and revealed a considerable quantity of pus. His bladder was explored with a sound, but

with entirely negative result. A course of treatment was now commenced, under which all symptoms subsided, and he was discharged from the hospital, but shortly after he again applied for admittance, complaining of passing his urine through his umbilicus. Examination revealed a complete vesico-umbilical fistula through which all of his urine was being passed. His mother stated that three weeks previously a growth had appeared at his umbilicus, which subsequently ruptured, leaving the fistula that entailed the derangement of function above mentioned.

An attempt was made to pass an instrument to the bladder by the urethra, but without success; therefore, a laminaria tent was introduced into the umbilical extremity of the fistula which had been *in situ* but about three hours, when urine was passed by the urethra for the first time in seven weeks. A catheter was now passed without difficulty. Obliteration of the abnormal opening was now accomplished by cauterization of the edges of the umbilical aperture and afterwards constricting it with a subcutaneous ligature passed around it. Healthy granulation followed and a complete closure resulted. It remained in this condition for about ten days, when suppuration supervened and it reopened. A further and more extensive cauterization was followed by closure again. The bladder now regained to some degree its function of retaining urine, holding it for periods of two hours. After about three weeks the umbilical orifice was again established without any apparent obstruction of the urethra, and urine flowed through both channels. A plastic operation, consisting in the transplanting of a flap from the healthy abdominal surface to the freshened edges of the orifice at the umbilicus was now performed and a closure again effected. A few days subsequently to this peritonitis set in which caused the death of the patient.

Necroscopy revealed some evidence of old peritonitis (the omentum was adherent). The bladder was much contracted and its walls proportionally thickened, springing from its fundus was an elongated cavity reaching to a level with the umbilicus, and measuring in width from one and a half to two and a half inches. Upon opening the bladder neoplastic growths resembling in appearance and in their mode of attachment the columnæ carneæ of the heart were found covering its inner surface. Microscopically, these were discovered to consist of fibrous tissue covered with mucous membrane, no evidence of true papillary structure presenting. The bladder contained a septum which was attached posteriorly immediately below the orifices of the ureters, and stretched so as to cover the orifice of the urethra. This was

divided in opening the bladder. The above cyst, the walls of which were thin and smooth, communicated with the bladder by a large opening. In the anterior walls of the cyst two small openings were found which had allowed of the extravasation of the fluid that set up the fatal peritonitis.

While this case illustrates the gravity of rupture internally, it also introduces us to another phase of our subject, namely, that of acquired permeability of the urachus. Several cases have been reported, which, like the foregoing, have become complete vesico-umbilical fistulas by a rupture at the umbilicus, where a cyst of the urachus previously existed, but, aside from these cases, in which a partial permeability has, by natural progress, or by some accident, become complete, there are other cases that presented no evidence of abnormality in this region, in which an umbilical outlet has been formed for the urine, from the bladder, through some obstruction of the natural channel, on account of which, over distention of the bladder resulted from retention of urine. Such a case has recently been reported by M. Jacoby, of Bromberg, in which retention of urine, caused by a urethral stricture, gave rise to this unusual lesion, to the great relief of the sufferings of the patient.

The *Medical Record* of Aug. 18, 1871, contains a record of the following interesting case.

A boy, æt. 1, commenced to pass his urine through a vesico-umbilical fistula, a few drops only passing by the urethra. An examination revealed a congenital phimosis with an orifice so small that the *vis a tergo* required to force the urine through it had exerted itself in an upward direction, and had opened up the urachus, rendering that structure patent throughout. After this fistula had persisted for some time the cause was discovered, and circumcision performed, when the urachus closed spontaneously.

This case emphasizes the importance of examining carefully the urethra before proceeding to operate for the closure of the fistula.

The diagnosis of this abnormality may seem too simple to demand any remark, and, indeed, it is simple when complete patency exists, but when it is only partial, and the tube un-



dilated, or, when it is much dilated, the diagnosis becomes much more difficult, and its true nature often escapes recognition by the most skilled diagnostician. The following characteristics will be found of some service where there is danger of confounding it with other abnormal growths in this region.

Where a cyst is attached in the pelvis in the median line and grows gradually from this attachment upwards towards the umbilicus, where it also has attachment, the uterus being depressed, it may be held to be a cyst of the urachus.

If the cyst be then punctured and the withdrawn fluid found to contain flattened epithelium along with urea, and the other urinary salts, the diagnosis is practically certain.

Considerable pathological importance is attached to this malformation, far more than the unpleasantness and inconvenience immediately connected with the escape of urine at the umbilicus. This has already been set forth in some of its phases in the cases reported. Another important feature is the difficulty in urinating that is sometimes experienced. This is well illustrated in the following case :

A married lady of middle age complained of not being able to pass her urine at pleasure, because when the bladder contracted to expell the urine, it, instead of passing through the urethra, passed upwards into a cyst of the urachus, where it would accumulate to the amount of several litres or the full capacity of the cyst. This, when distended, could be emptied by compression applied externally, the urine being forced into the bladder again. By continuing this pressure she would then be able to pass some urine by the urethra, but complete evacuation of the bladder could be obtained only by employing a catheter. She became pregnant, in the progress of which the enlarged uterus compressed and obliterated the lumen of the urachus below the cyst, confining therein a considerable quantity of fluid. The encroachment of this on the abdominal cavity finally necessitated its removal, which was accomplished by puncture. Following this the period of gestation was completed without farther incident. Four years later the same conditions called for relief. The same treatment was resorted to and the contents of the cyst removed, but abortion followed. The communication between the cyst and bladder was now found to be obliterated, and no farther annoyance was experienced.



Another interesting complication occurred in a patient of whom a report is contained in the *Medical Record* of February, 1879. He was a mechanic of spare habit, and complained of soreness and constant pain at the umbilicus, in which location there was a hard, rounded tumor. Under expectant treatment this grew gradually for a long time, the pains becoming more and more agonizing, until as a *dernier ressort* the swelling was incised, when, at the depth of about six lines a solid concretion the size of a walnut, presenting the characteristics of a phosphatic calculus was found and removed. The odor of this mass was strongly urinous. The urachus was patent. He stated that he had had a previous similar attack.

Since laparotomy has become so common among gynæcologists and general surgeons, this deformity has assumed new significance, having in numerous instances formed a grave complication in this procedure. Our esteemed contemporary Dr. Helmuth, met with a case in which it complicated an ovariectomy, a report of which through his courtesy I am permitted to give here :

Contribution to Gynæcological Surgery, page 16. Case XII. *Ovarian cystoma, overlaid by a cyst of the urachus which had burst during childhood and obliterated the umbilicus. Ovariectomy. Death.*

Mrs. ———, æt. 54, a Swiss, of small stature and slightly built, married; childless. At the age of seven years her abdomen appeared to be enlarged; at fourteen a tumor, the size of an apple, appeared at the umbilicus, which burst, sending forth a stream of water with considerable force. Her menses ceased at the age of forty-four, when her abdomen became enlarged and sensitive to pressure. Incontinence of urine was a source of great discomfort to her, especially at night, when the dripping would awaken her. I withdrew with the aspirator about a quart of viscid, dark fluid, which showed inflammatory and pus corpuscles, and blood globules and a profusion of Drysdale's granular bodies. In ovariectomy, after dividing the peritoneum, I came upon a substance which puzzled me; it looked something like a cyst-wall, but was so densely adherent to the abdomen at the umbilicus that it was impossible to separate the adhesion; laterally (on each side of the incision) the substance disappeared. After vainly endeavoring to push this sufficiently aside, I determined to incise it, which I did. A gush of fluid followed, and for a moment I believed I had opened the sac.

Upon introducing my fingers into the incision, I soon discovered that the canal communicated directly with the bladder. I then forcibly drew this emptied sac aside and without difficulty removed the tumor.

From some experience in supra-pubic lithotomy, I determined to bring the wall of the bladder cyst together with carbolized catgut, which I did. A self-retaining catheter was placed in the bladder and the woman put to bed. She died on the evening of the fifth day from peritonitis.

This case of patulous and cystic urachus, leading from the fundus of the bladder to the umbilicus, accounts for many peculiar symptoms detailed by the patient.

The bursting of the umbilicus in early life, when "the water spouted up to the ceiling," was the rupture of the external wall of the cyst which, indeed, was proved by the cicatrix, smooth and white, which occupied the front in the abdominal wall where the navel should have been.

Dr. Atlee, in his tenth case, had somewhat the same experience, and thus writes of it: "The only conclusion possible, considering the extra-peritoneal and elevated locality of this urine cyst, is that it was a purse in a dilated urachus, which, although closed at the umbilicus, had from birth maintained a communication with the bladder. For such freaks of nature no surgeon can be held responsible, nor can he guard against them." A somewhat similar case is recorded in the *Medical Record* for January, 1878, and Dr. T. G. Thomas has more recently operated for a like condition with success."

Dr. McLean, of Troy, gives an account of an ovariectomy complicated with cyst of the urachus in the *Medical Record* of February 8, 1879. The case terminated fatally.

Mr. Lawson Tait mentions these cysts as "not of infrequent occurrence." His work on the ovaries contains a somewhat detailed account of two cases which he denominates extra-peritoneal cysts. He believes these to have been urachal cysts. He operated for the removal of these in a late stage of their existence, after the patients were reduced by them to an almost moribund condition. The operation terminated fatally in both cases. In conclusion, he makes the following statement: "These cases illustrate very well the unexpected and great difficulties which arise in the practice of abdominal surgery, and how much we have yet to learn in this important

branch of our art. They also illustrate the abundant causes we have for regretting that abdominal tumors are often allowed to go so long as to remove any reasonable prospect of success in dealing with them."

This is essentially a surgical lesion, and depends for its relief upon surgical means, the exact method of which is decided by the peculiarities of each case, and upon the degree to which the perviousness exists. When it is only partial, and when the patent portion becomes distended to a cyst, the treatment may be either palliative or radical; the former consists in evacuating the contents of the sac by some means, usually by puncture. The tendency to the re-accumulation of the fluid renders this method unsatisfactory, and it has often proved dangerous and led to a fatal issue, because of the cachexia produced by the continual tapping and reaccumulation by which a more radical operation is deferred and rendered dangerous. The two cases above referred to of Mr. Tait's substantiate this view, both cases before they were subjected to the radical operation having become so reduced that they had not vitality enough left to enable them to endure the shock. The operation, which above all must be most successful under our present perfect antiseptic methods, is the early extirpation of the cyst.

In case of vesico-umbilical fistula several procedures have been devised and practiced. The following case illustrates one method and demonstrates its efficiency.

CASE.—A child, æt. five months; the urachus was completely pervious and admitted a medium-sized catheter. At its umbilical extremity was an outgrowth that resembled a strawberry. This was encircled with a subcutaneous ligature by which it was removed. Afterwards the edges were pared and sutured, when a complete closure followed.

Another means which has been to some degree useful is the cauterization of the opening followed by constriction of it by a subcutaneous ligature. The plan which has been most followed and the last to be mentioned is refreshing of the site of the opening, and the transplanting of a flap from a healthy portion of the abdominal surface. Though this method is

somewhat complicated, it commends itself by the universal success which has followed its employment in closing the orifice.

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## EDITORIAL ARTICLES.

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### THE PATHOLOGY OF PERITONITIS.

An important study of the mode of action of micro-organisms in the causation of peritonitis, which also teaches many important surgical lessons, has been recently made by Grawitz.<sup>1</sup> Wegner's well-known researches<sup>2</sup> laid the foundation of our modern knowledge of peritonitis, and it is necessary first to give a brief review of his results. Wegner concluded that the important factors in peritonitis were the immense superficial area of the peritoneum, the large amount of fluid it is capable of exuding, and the large amount it can absorb. By his experiments on rabbits, he found that ordinary atmospheric air and various fluids (such as serum, bile, even urine), when introduced into the peritoneal cavity, are simply absorbed and do not produce peritonitis. Any solid particles in the fluids were encapsulated. When air and putrescible fluids were introduced together in a quantity greater than could be absorbed in a short time, decomposition set in, its products were absorbed, and the animal died of septicæmia. He found one remarkable exception—living defibrinated blood never decomposed under these circumstances. He concluded that the dangers in peritoneal wounds and inflammations were those of septicæmia, for in no case did he succeed in producing peritonitis. But his results apply only to the peritoneum as forming one of the cavities of the body. Grawitz has studied it as one of the tissues, as capable of inflammation.

In all Wegner's experiments the effects were due to the micro-organisms of decomposition—those of suppuration were then unknown. It is now settled, however, that suppuration cannot be caused by chemical

<sup>1</sup> "Statistischer und experimentell-pathologischer Beitrag zur Kenntniss der Peritonitis."—*Charité-Annalen*, XI. Jahrb., 770.

<sup>2</sup> *Langenbeck's Arch. f. klin. Chir.* Bd. XX., 1, p. 51.

reagents, and we can assert that wherever there is pus, micro-organisms have been at work—and usually certain specific varieties. So Grawitz finds that a large number of species of micro-organisms do not cause suppurative peritonitis when introduced into the peritoneal cavity, and that even the specific pus-producing forms can cause suppuration only under certain conditions.

The results of Grawitz's experiments on animals are as follows:—The introduction into the healthy peritoneal cavity of rabbits, of the ordinary forms of micro-organisms (even in large quantity), of the same together with putrescible albuminous substances (spleen-pulp), of cholera-bacilli, and even of fecal matter—produced no peritonitis, if the quantity was not greater than the peritoneum could absorb or safely encapsule in a limited time—about one hour. When the absorptive power of the peritoneum had been impaired, the same agents were more slowly absorbed, but produced no peritonitis, although septicæmia resulted if the micro-organisms had the power of decomposing albumen. Pure cultures of micro-organisms capable of producing suppuration, provided the injected fluid was not chemically irritating, and not too great in amount (not much over 10 ccm.), produced no inflammation in a normal peritoneum. But they did produce suppurative peritonitis under the following conditions:—

(a.) When stagnant fluid was present, capable of nourishing the micro-organisms (salt-solution, bouillon)—the bacteria developing more rapidly than the peritoneum could absorb them.

(b.) When caustic solutions had prepared a field for the growth of the micro-organisms by destroying the surface of the peritoneum.

(c.) Especially, when a wound of the peritoneum was present—even the hypodermic puncture made in introducing the cultures may be the starting-point of peritonitis.

Grawitz then adds a statistical study of the post-mortem examinations of 867 cases of peritonitis. He agrees with Leyden,<sup>1</sup> that “idiopathic” peritonitis can occur only when the pus-producing micro-organisms have implanted themselves in some part of the body from

<sup>1</sup> Deutsch. med. Wochenschr., 1884, No. 17.



which they can invade the peritoneum ; but he makes the further conditions, that there must also exist an injury of that membrane, or a stagnant fluid in its cavity beyond its powers of absorption.

“ Taking cold ” is the most frequently assumed cause of idiopathic, or rheumatic peritonitis. To test the effects of cold, Grawitz shaved and poulticed the abdomen in rabbits, and then suddenly exposed it to a draught of ice-cold air ; but the animals gradually recovered without feeling any ill effects from the exposure. Equally negative in results were similar experiments preceded by the introduction of pus-producing micro-organisms into the intestinal canal, or into the peritoneal cavity. When they were introduced directly into the blood-circulation, abscesses in the heart-muscle, with suppurative pericarditis, pleuritis, and peritonitis were, indeed, produced—but never peritonitis alone. He, therefore, concludes that exposure to cold cannot be considered a true cause of peritonitis, although it may be accessory by disturbing the local circulation, or by increasing peristalsis—which might hasten the perforation of an intestinal ulcer.

Grawitz explains the frequency of idiopathic peritonitis in women about the menstrual epoch as due to the implantation of micro-organisms upon the newly opened Graafian follicle in the ovary, which supplies the necessary break in the surface of the peritoneum, reminding us that the micro-organisms may reach this spot by the circulation of the blood from a distant part of the body (a tonsillitis, for instance) as well as through the uterine canal. But the second predisposing cause is much more frequently at hand in idiopathic peritonitis—the presence of a stagnant fluid in the peritoneal sac, caused, for example, by cirrhosis of the liver, or by nephritis.

Peritonitis from perforation of the hollow viscera has a better prognosis than puerperal peritonitis, for proofs of its former existence and recovery are frequently discovered at autopsy. The danger in these cases depends upon three factors:—the quality of the extravasated material ; its quantity, which is even more important, for if it oversteps the absorptive power of the peritoneum septicæmia, or peritonitis, or both are unavoidable ; and the character of the perforating process—most important of all, according to Grawitz, as his experiments show

how dangerous to the peritoneum is a spot upon its boundaries where micro-organisms can take root. Because bacterial colonies exist in the tissues surrounding an ulcer, while the edges of a traumatic perforation are uninfected, Grawitz considers the prognosis in the latter case the better of the two. Rupture of the bladder, in particular, should have a good prognosis, provided laparotomy was done before the slow absorption of urine had gone too far, and before infection had been caused by use of the catheter. For fear lest this supposition as to the less gravity of the prognosis in traumatic cases do harm to the cause of early operative interference, in spite of the recommendation of laparotomy which accompanies it, we feel compelled to indicate that in practice two peculiarities of traumatic perforation quite overshadow this theoretical point in its favor. These peculiarities are the shock caused by the injury or by the sudden entrance of urine or feces into the peritoneal cavity—a shock which is in many cases of rupture of intestine the immediate cause of death; and the much more rapid spread of peritonitis in an abdomen free from the peritoneal adhesions so common in cases of perforating ulcer. These two facts are enough to justify the accepted opinion that the prognosis is worse in traumatic perforation than in non-traumatic.

Grawitz calls attention to several cases of fatal peritonitis following tapping for ascites, in order to emphasize the necessity of taking every antiseptic precaution in this little operation, as the presence of the fluid and the impaired absorptive power of the peritoneum increase the danger of infection.

In peritonitis from strangulated hernia and intestinal obstruction, the local disturbances of circulation alone may cause ecchymosis, fluid or even fibrinous exudation—in fact an *anatomical* peritonitis; but decomposition or suppuration are not present, and there is no danger of exciting suppurative peritonitis by returning the constricted loop to the abdominal cavity. But if the tissues of the gut are invaded by micro-organisms, they may easily penetrate the entire thickness of its wall, and are liable to spread thence and cause general suppurative peritonitis. In fact, the reposition of a loop of intestine in this state is even more dangerous than the return of a loop with a small accidental

perforating wound, but with its tissues uninfected. Experiments on rabbits show that excessive distention of the intestines by complete obstruction may of itself produce death, just as in man, but cannot produce peritonitis, although the diminished movements of the diaphragm and intestines certainly favor its occurrence by reducing the absorptive power of the peritoneum. If, however, there is the least break in the continuity of the intestinal wall, even a superficial ulceration of the mucous membrane, micro-organisms will find an entrance, penetrate to the peritoneum, and peritonitis will follow.

Grawitz finds that tuberculous peritonitis is governed by the same laws as suppurative—both being due to micro-organisms. Therefore the same conditions favor the primary tuberculous forms, and the idiopathic suppurative peritonitis, and he gives a case in which ascites from cirrhosis of the liver was the predisposing cause for a primary tuberculous infection of the peritoneum. The secondary form is accordingly due to direct infection of the peritoneum by some neighboring tuberculous point.

Of the many practical deductions as to abdominal surgery to be drawn from this important essay we have room only to mention the necessity of avoiding raw surfaces in the peritoneal cavity, of a thorough toilet of the peritoneum, and of drainage in every case where any accumulation of fluid is likely to occur.

B. FARQUHAR CURTIS.

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#### GASTROTOMY FOR FOREIGN BODIES.

1. Gastrotomie wegen Fremdkörper. Von Dr. B. Credé. *Archiv.f. klinische Chirurgie*. Bd. XXXIII. Hft. 3.
2. A case of Gastrotomy, Digital Exploration of the Oesophagus, and Removal of Plate of Teeth. Recovery. Remarks upon the Operation and Observations upon the Anatomy of the Oesophagus. By Maurice H. Richardson, M.D. *Boston Med. and Surg. Jour.* 1886. Dec. 16.
3. A Successful Case of Gastrotomy, with Critical Remarks. By Augustus C. Bernays, M.D. *Medical News*. 1887. Jan. 1.

During the year 1886 four cases occurred in which foreign bodies, that had been swallowed, were removed from the stomach by means

of laparotomy and gastrotomy. In two of these cases artificial dentures, in one a table fork, and in the other a table knife, were the objects that had been swallowed.

That so many cases should have been reported within so short a time is the more remarkable from the comparatively few cases which hitherto have been recorded. The three papers, whose titles are given above, have as their *motif*, in each instance, a recent case. The fourth case was reported by Pollailon, of Paris, and is published in the proceedings of the Academy of Medicine, Paris, of Aug. 24, 1886.

As Credé remarks in the outset of his memoir, the swallowing of undesirable articles is a very frequent accident. Usually they are either vomited up or pass naturally through the intestinal canal, even when the body is so large that such an event would hardly seem possible. Occasionally such an object has, by reason of the irritation caused by it, produced adhesion of the stomach or intestine to the abdominal wall, and finally, having accomplished perforation of this covering, has escaped spontaneously, or has been removed by a simple incision. Quite a large proportion of the so-called cases of gastrotomy for foreign bodies belong to this class. The following table of these cases is given by Richardson :

CASES WHERE THE STOMACH WALL IS INJURED AND ADHERENT TO ABDOMINAL  
PARIETES.

No.	Operation.	Nature of Body.	Stay in Stomach.	Result.
1	Florian Mathis, 1602.	Knife.	51 days.	Recovery.
2	Wesener, 1692.	Knife.	10 months.	"
3	Hülner, 1720.	Knife.	11 days.	"
4	Frizac, 1786.	Knife.		"
5	Cayroche, 1819.	Silver fork.	7 <sup>2</sup> / <sub>3</sub> months.	"
6	Bertherand, 1823.	Silver spoon.	7 days.	"
7	Fideli, 1836.	Brass fork.	2 <sup>1</sup> / <sub>2</sub> years.	"
8	Hohlbeck, 1858.	Iron fork.	6 <sup>1</sup> / <sub>2</sub> months.	Death.
9	McKee, 1879.	Copper wire.	3 <sup>1</sup> / <sub>2</sub> months.	Recovery.
10	Fleury, 1880.	Fork.	2 months.	"
11	Gerard, 1882.	Wood.	6 weeks.	"

The surgical interference in such cases as these is of the simplest possible character. The cases themselves illustrate the conservative efforts of nature, the work of the surgeon having been simply to hasten

or guide an expulsion that was being accomplished spontaneously, The only case with fatal result that is included in the table, that of Hohlbeck, was not a result of surgical intervention, but took place three months later from caries of the sternum and ribs, presumably a sequel to the suppurative inflammation occasioned by the foreign body in its course of reaching the surface of the body. All these cases, which figure largely in the records of cases accumulated in the papers of Credé and of Richardson, ought hereafter to be eliminated from the statistics of gastrotomy, although they remain of interest in connection with the possible results of large foreign bodies that have been swallowed. It is evidently impossible, however, to use them for comparative purposes in estimating the dangers from the presence of such bodies in the stomach, for there is no possibility of obtaining a companion list of the cases in which this conservative adhesion with the abdominal parietes, before the perforation of the stomach wall, has failed to take place, and fatal peritonitis, or exhaustion from malnutrition, or irremediable obstruction of the intestinal canal at some point farther along in its course, has resulted.

A second table of incompletely reported or not well authenticated cases, is given by Credé and by Richardson. Some of these evidently belong to the class already commented upon above, while others are probably cases which properly come under the classification of gastrotomy. Unfortunately the incompleteness of the reports makes them useless for statistical purposes. The following is the list given by Richardson, omitting the cases of Bernays and Pollailon, which are now fully reported :

## INCOMPLETE OR NOT WELL AUTHENTICATED CASES.

No.	Operation.	Nature of Body.	Result.
1	Reynaud.	Fork.	Recovery.
2	Dr. L——.	Silver spoon.	"
3	Garcia, 1830.	Stick of wood.	"
4	Glück, 1856.	Laryngeal probang.	Death.
5	——, 1856.	Fork.	Recovery.
6	Bouchet.	Silver fork.	Unknown.
7	Felizet, 1880.	Spoon.	Recovery.
8	Hashimoto, 1882.	Tooth brush.	"

The number of reported cases of gastrotomy proper, for the removal of foreign bodies, is reduced by the exclusion of the two classes of cases just mentioned to thirteen or a possible fourteen. Richardson, among the synopses of cases which he gives, includes a case which does not appear in either Credé's or Bernays' tables. This is the more strange since it is referred to a comparatively recent German source—*Berlin klin. Wochenschrift*, 1880—which Credé would not have been likely to overlook, especially as he claims to have taken great pains in the thorough and critical examination of the reports hitherto published. Richardson reports it thus :

1880. Billé's case. This patient used a pencil covered by a sponge, and the whole attached to a new silver wire 50 centimetres long, for the purpose of clearing the slime out of his œsophagus. May 2, 1877, it broke off, and part was left in the œsophagus. Billé first did an œsophagotomy at the level of the hyoid bone, but was not able to grasp the wire. Later he did gastrotomy by an incision through the abdominal wall and peritoneum,  $3\frac{1}{2}$  centimetres long, 'two fingers' breadth below the margin of the ribs. An incision  $2\frac{1}{2}$  centimetres long was made into the stomach, which was made solid with the abdominal wall before incising the mucous coat. The sponge was felt near the pylorus. This was seized with a pair of forceps and the whole extracted. The upper end of the wire was in the lower extremity of the œsophagus. The whole fragment was  $31\frac{5}{10}$  centimetres long. Patient died five days after operation.

Of the other thirteen cases Bernays gives a very complete and valuable synoptical table which is herewith reproduced.



TABLE OF GASTROTOMIES FOR THE REMOVAL OF FOREIGN BODIES, IN WHICH THERE

<i>Case, Sex and Age.</i>	<i>Operator.</i>	<i>Foreign Body</i>	<i>Time in Stom- ach.</i>	<i>Condition before Operation.</i>
I. M. 22	Schwabe, Baldinger's Neues Mag. f. Aertze, B. xiii., 1791, p. 67; Berliner klin. Woch., No 7, 1883; Hart- knock's Altes und Neues Preussen, 1684.	Table knife 6 1-4 in. long, 5-6 in broad.	41 days.	No serious inconvenience.
II. F. 32	Tilanus, Ort. Diss. continua- causum gastrotomiæ cet Lugduni, Batavorum, 1853.	Silver fork, 8 1-2 in. long, and some frag- ments of crockery, triangular in shape, largest piece being 7-8 in. in its greatest length.	3 days.	Very weak; great difficulty in swallowing. Diagnosis confirmed by sounding and by examination of region of stomach.
III. M. 27	Bell, The American Journal of the Medical Sciences, July, 1855, p. 272.	Bar of lead 9 in. long, 1-5 in. in diameter.	9 days.	No serious inconvenience at the beginning; on the 6th day vomiting and great prostration. Palpation failed to reveal the pres- ence of a foreign body.
IV. M. 18	Labbé, Gazette Hebdomad. Deuxieme Serie, xiii. (xxiii.) 18, 1876, p. 273.	Five-tined German sil- ver fork.	2 yrs. and 10 days.	No serious inconvenience for six months. Later on attacks of syncope and symptoms of severe gas- tralgia came on.
V. M. 37	Kocher. Correspondenz- Blatt fur Schweizer Aerzte, 1883, Nos. 23 and 24.	Piece of a broken instru- ment (a probang with bucket).	1 day.	No serious inconvenience.
VI. M. 19	Gussenbauer, Wiener medi- zinische Wochenschrift, 1883, Nos. 51 and 52.	Broken sword-blade, 10 3-4 in. in length. Point rounded off; broken end rough and jagged.	2 days.	Great pain. Emetics and in- version of body tried first. High fever, vomiting and hiccough.
VII. F. 15	Schcenborn, Langenbeck's Archiv. fur Chirurgie, B. xxix., p. 609.	Hair tumor, reniform and very hard.	4 years.	Vomiting; a freely movable tumor in the left hypo- chondrium could be felt.

EXISTED NO ADHESIONS BETWEEN THE STOMACH AND ABDOMINAL WALL.—(Bernays).

<i>Operation.</i>	<i>After-treatment and Remarks</i>	<i>Final Result.</i>
Incision $1\frac{1}{2}$ in. below and parallel to ribs on left side. Stomach pulled out by means of a curved needle, cut through on point of swallowed knife. The incision "snapped shut" after knife had been extracted. Abdominal incision closed with five sutures; operation without anæsthetics.	External sutures removed on 2d and 3d days. Bloody urine and stools during first two days. Wound washed with wine; strict diet for two days, in which time wound entirely healed.	Patient for many years enjoyed perfect health.
Etherized. Incision in the linea alba, 3 in. Stomach drawn up with two forceps and opening made into anterior wall 1 in. in length, causing considerable hæmorrhage. Search for fork and crockery very troublesome. Stomach was closed by five sutures, whose ends hung out of lower end of the abdominal incision, which was closed by ordinary suture.	Vomiting of a greenish fluid; pain and tympanites during the first 2 days. Feeble and high pulse during 2d day. Death on 3d day.	Post-mortem showed plastic material which caused adhesions between stomach, liver and abdominal parietes. Gastric incision entirely closed. Stomach much distended. Upper third of œsophagus much lacerated and perforat'd opposite larynx. A pus sinus along lobe of thyroid.
An incision beginning at second false rib, 4 in. in length, and in a direct line toward the umbilicus. A small incision was made into the stomach upon the bar of lead. After extraction contraction of stomach closed the opening. Pro-lapse of some of the intestines during the operation. Abdomen closed by interrupted suture.	Symptoms of gastritis immediately after operation. Injections of morphia freely given; patient discharged in two weeks.	Complete recovery.
Futile attempts were made to cause adhesion between stomach and parietes, by means of external applications. Laparotomy parallel to ribs; incision less than 2 in. Stomach pulled out by forceps and attached to abdominal incision before opening. Fork extracted with polypus forceps.	A strong collodion cuirass was applied to the abdomen. Solid food after fifth day. Wound healed kindly, leaving gastric fistula. Patient discharged on 15th day, a small gastric fistula remaining (purely gastrotomy).	Recovery. (It is not stated how long the fistula persisted).
Oblique incision $\frac{3}{4}$ in. from edge of ribs. stomach drawn up by two loops of three d. Incision in stomach over 1 in. long; was closed by 10 Lembert sutures.	Careful diet; no fever. Union by first intention.	Complete recovery.
Blade extracted with great difficulty after a large opening had been made in stomach.	Death in two days; due to septic peritonitis.	Post-mortem showed that stomach had been perforated by the point, and œsophagus by broken end.
Laparotomy in linea alba. Tumor lying loose; incision in stomach large and parallel and between the curvatures. Wound closed by 65 Madelung sutures.	Union by first intention. In three weeks she was discharged.	Complete recovery.

TABLE OF GASTROTOMIES FOR THE REMOVAL OF FOREIGN BODIES, IN WHICH THERE EXISTED

<i>Case, Sex and Age.</i>	<i>Operator.</i>	<i>Foreign Body.</i>	<i>Time in Stomach.</i>	<i>Condition before Operation.</i>
VIII. F. 17	Thornton, Lancet 1884, No. 3.	Hair tumor, weighing 2 1-4 pounds.	Several years.	An abdominal tumor was revealed by palpation. Patient very much emaciated
IX. F. 19	Billroth. Von Hacker, Magen Operationen in Prof. Billroth's Klinik von 1880 bis 1885. Vienna, Toeplitz & Deutsche, 1885.	Artificial denture, six teeth	2 days.	But little inconvenience.
X. M. 24	Credé Von Langenbeck's Archiv. für Chirurgie, B. XXXIII, p. 574, 1886.	Hard rubber denture; eight teeth and clasps	15 days.	Vomiting and insomnia, accompanied by great nervous excitement.
XI. M. 25	Pollillon, Procédés de l'Académie de Méd., Aug. 24, 1885.	A fork.	A few days.	But little inconvenience.
XII. M. 27	Richardson, Boston Med. and Surg. Jour., vol. cxv., No. 24, 1886.	Artificial denture, four teeth and clasps.	11 mos.	Greatly emaciated; foreign body was situated in the lower part of the œsophagus, just above the cardia.
XIII. M. 33	Bernays, the Medical News, Jan. 1, 1887.	Silver-plated, metallick table knife, 9 1-4 in. nearly long.	1 hour	Frequent paroxysmal contractions of the stomach which, however, did not produce emesis.

NO ADHESIONS BETWEEN THE STOMACH AND ABDOMINAL WALLS. (Bernays)—*Continued.*

<i>Operation</i>	<i>After-treatment and Remarks.</i>	<i>Final Result.</i>
Tumor filled entire cavity of stomach. Incision in stomach closed by several tiers of sutures.	A sponge was left in the abdominal cavity, but was removed on the 28th day by reopening incision. Had double parotitis and concomitant fever.	Complete recovery.
Incision 4½ in. along border of ribs and beginning at ensiform cartilage. Stomach held by two loops of thread and denture extracted through a small opening, which was closed by a number of ordinary external, interrupted sutures, and then these were buried by two rows of Lembert sutures.	The healing unaccompanied by any febrile symptoms. Left hospital 5 weeks after operation.	Complete recovery.
Oblique incision, 5 in., parallel to ribs and beginning at ensiform cartilage. Foreign body was found near pylorus. Incision in stomach 2 in. Three rows of sutures used.	No vomiting or febrile disturbances. 21 days after the operation was discharged.	Complete recovery.
Transverse incision, 7 cm. long; stomach pulled out by two needles, incision 3 cm. long. Fork pulled out with forceps. Wound united with catgut sutures. Stomach replaced, external wound closed by 8 sutures.	Union by first intention.	Complete recovery.
Oblique incision parallel to ribs. Stomach pulled out, and an incision made long enough to admit hand and forearm. Extraction of foreign body with fingers, considerable difficulty experienced before it could be brought through the cardia and into the stomach. Mucous membrane united by a continuous silk suture. The peritoneal surface united by 36 fine silk Lembert sutures.	Union by first intention, with exception of some stitch-hole suppuration.	Complete recovery.
Five-inch incision in linea alba, between xiphoid cartilage and umbilicus. Stomach drawn up by two "Army" bullet forceps. Incision about 5/8 in. upon the handle of the knife. Gastric wound closed by five interrupted catgut sutures and then buried by 8 Lembert stitches, in one row. 18 sutures closed the abdominal incision.	Union by first intention. Fed per rectum; a little water allowed. No fever and no vomiting. Patient up and about ten days after operation.	Complete recovery.

One cannot fail to be struck with the uniform good results that have been secured in these cases—of the thirteen cases in the table but two failed to make a prompt recovery, those of Tilanus and Gussenbauer, and in both there were special complications to which the unfortunate event is fairly referable. In the case of Tilanus, the patient is stated to have been very weak at the time of operation, the foreign bodies were multiple, the search required for the detection and removal was very troublesome; the stomach sutures were left long and brought out through the abdominal incision determining a peritonitis—as the autopsy showed—which caused adhesions between the stomach, liver and abdominal parietes. To this the peritonitis may reasonably be attributed, also the vomiting, pain and tympanites which immediately followed the operation. In Gussenbauer's case the fatal peritonitis had already developed before operative interference. The results in the remaining cases are such as to encourage prompt operation, and to warrant the expectation that recovery will ensue provided reasonable judgment is exercised in the selection of the operative method.

In any case where a foreign body has been swallowed too large to be voided *per vias naturales*, the first question for the surgeon's consideration must be, how long operative interference should be delayed! The example of Bernays would give as an answer, no longer than is necessary to make the required arrangements for the operation? Within an hour from the time that the object was swallowed the operator had extracted it. The special haste in resorting to operation in this case was due to the fear on the part of the surgeon that the violent attacks of retching that the presence of the knife in the stomach was provoking, might cause the stomach to be perforated, or otherwise seriously injured.

Reference to the table will show that in a considerable proportion of the cases no serious inconvenience for some time was caused by the presence of the foreign body in the stomach; in other cases vomiting, pain, and progressive emaciation resulted; these latter symptoms also supervened in some of the cases that at first were free from inconvenience. In the present state of experience on the subject, the conclusion seems a fair one that, if an operation is to be made at all, the

earlier it is done the better, provided the proper conditions for the safety of the patient during and after the operation are obtainable.

Where shall the preliminary incision through the abdominal wall be made?

On the left side an oblique incision at a little distance from the ribs, and parallel to them, has been the most frequently chosen, but equally favorable results have followed the use of transverse and of longitudinal incisions in the linea alba. Credé and Richardson used an oblique incision; Pollailon a transverse one, and Bernays a longitudinal one. The oblique incision in the left hypochondrium exposes the stomach more centrally, but it is not so favorable for explorative purposes, nor is the anatomical arrangement of the structures involved in this incision so simple, and therefore so favorable to prompt and sound healing as in the linea alba. If the foreign body can be felt by manipulation through the abdominal wall, its location, thus ascertained, ought to determine the site of the incision. The particular direction of it will then be determined by the view which the operator may entertain as to the advisability of avoiding such vessels and nerves as may be involved in the region, or of preserving muscles intact, or by the vicinity of the receding border of the costal cartilages. Bernays made a five-inch long incision in the linea alba midway between the ensiform process and the umbilicus. After opening the peritoneum, he introduced his hand into the cavity and, feeling the knife lying in the long axis of the stomach with its handle near the pylorus, he grasped this handle through the stomach wall and conducted it out of the abdominal incision, covered by the anterior wall of the stomach which was pushed before it. The protruding viscus being then steadied between two pairs of forceps, an incision just large enough to permit the knife to be pulled through, not over five-eighths of an inch long, was made, and the knife delivered, without the escape of a drop of the contents of the stomach.

Richardson's case involved manipulations of a much more extensive character. His patient was a man, thirty-seven years of age, who, eleven months before, had swallowed an artificial denture consisting of a plate about the size of a silver half-dollar, to which four teeth were



attached. This had lodged in the œsophagus, fourteen inches from the incisor teeth, just above its point of entrance into the stomach. The man, who was robust at the time of the accident, had become extremely emaciated; could with difficulty swallow enough liquid food to keep him alive, and was suffering constant and severe pain in the epigastrium and back. The operation was undertaken with the purpose of reaching the foreign body through the stomach, and having dislodged it to bring it down into the stomach and then deliver it. The operation was entirely without precedent, but was successfully accomplished, as follows :

“An incision about six inches long was made one and one-half inches below and parallel to the margin of the ribs in the left hypochondrium. It began at the outer border of the *rectus abdominis*, three inches from tip of ensiform cartilage, and extended outwards and downwards. The abdominal wall was rapidly cut, layer by layer, until, all bleeding having been stopped, the peritoneal cavity was opened. The abdominal opening was held up by means of a T-hook at each extremity. The stomach was found lying empty in its usual position. An external examination was made of the cardiac orifice and of the whole stomach, to see if the foreign body might not be found and dislodged by manipulations. Nothing could be detected either in the stomach or the diaphragmatic opening. The stomach was now drawn out of the abdominal wound as far as possible, and placed upon a carbolized towel, and in this position all the subsequent manipulations were done. A small incision about one and one-half inches long was first made through the anterior wall of the stomach, beginning near the pylorus, and extending upwards and backwards midway between the greater and lesser curvatures. The walls were very thick and vascular. After cutting through the peritoneal and muscular layer, a dense network of large and tortuous vessels came into view, which, on being divided, bled very profusely. This was controlled by smooth-bladed hæmostatic forceps.

After two unsuccessful attempts to introduce grasping instruments into the œsophagus through this small opening, the incision was enlarged sufficiently to admit the hand and forearm. The stomach was

first wiped out with sponges and held with T-hooks. The walls of the diaphragmatic opening were found with some difficulty after passing the hand seemingly a very great distance. The middle and index fingers were then pushed up the œsophagus between the heart in front and aorta behind until the plate was felt, with the teeth pointing downwards, apparently embedded in a mass of soft granulations. The hand was withdrawn, and long-bladed forceps introduced into the œsophagus, guided by the index finger, but attempts to grasp the plate were unsuccessful. A hand was then re-introduced, and by careful manipulation with the index finger, succeeded in detaching the left extremity of the plate from its bed in the left side of the canal. The other extremity was then loosened from the right side, and the plate passed easily into the grasp of the fingers, and was withdrawn from the stomach."

As to the manner in which the stomach wound should be treated there is no difference in opinion. It is to be sutured and the stomach dropped back into its place. The experience which has accumulated in the operations for resection of the stomach for cancer has established the method of procedure in other stomach-wounds. The cut edges are first carefully stitched together by a row of closely set sutures—preferably interrupted—that do not involve the mucous surface, but embrace only the peritoneal, muscular and submucous coats. These are then reinforced by a row of Lembert sutures. Fine silk will always give satisfaction for making these sutures.

The external wound is to be closed in the same manner as after laparotomy, by deep and superficial sutures covered with some soft and absorbent protective dressing.

The after treatment involves abstention from food by the mouth for the first four or five days, a little water only being occasionally allowed, rectal alimentation being depended on.

The experience of Dr. Richardson, in the case detailed, led him to make a series of tests as to the readiness with which foreign bodies impacted in various parts of the œsophagus could be reached, either from above by œsophagotomy, or from below by gastrotomy. From his observations he thinks it may be asserted that *there is no part of*

*the human œsophagus which may not be reached, or very nearly reached with the finger either by gastrotomy or by œsophagotomy.* Also that with the finger as a guide instruments may be used with intelligence upon any part of the canal.

With regard to the treatment of bodies impacted in the œsophagus his conclusions are as follows :

When all other means have failed, and the foreign body is found by measurement to be within reach by œsophagotomy, this should be done as soon as serious symptoms appear. If it is found that the body is within reach from below, that is, more than thirteen, possibly twelve inches from the incisors, and if the patient is in danger, as shown by constitutional symptoms, or imperiled by starvation, the stomach should be opened immediately, and attempts made to dislodge. If the symptoms are not urgent, a reasonable time should be allowed for natural efforts to aid in expulsion, but the operation should be done early enough to prevent the secondary changes of ulceration and perforation. If it is demonstrated that the foreign body is beyond the reach of œsophagotomy, and yet too high to be easily reached by the fingers from below, suitable instruments should be introduced through the stomach, guided by the finger, if necessary, for cutting, crushing, grasping or pulling down.

L. S. PILCHER.

# INDEX OF SURGICAL PROGRESS.

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## GENERAL SURGERY.

**I. Clinical Observations on Erysipelas.** BY DR. K. E. VON LINDEN, (Helsingfors). The 135 cases forming the material for this article were observed in the years 1878-80, in a Finnish hospital. He sums up his conclusions as follows: The duration of erysipelas varies somewhat according to the point of origin, being shortest when it starts from the head or upper extremity and longest when from a lower extremity or the trunk. It lasts longer in weakly subjects and longest in those weaklings previously subjected to an operation. Erysipelas originating after operative procedures lasts longer than otherwise. Cicatricial tissue is more disposed to its development than normal skin; possibly the same holds for regions of skin exposed to mechanical pressure.

Primary erysipelas is usually severer than recurring attacks, though after seven or eight months have elapsed this is no longer evident. Atmospheric conditions were not found to have any very marked influence.

Alcoholic injections were found more useful than carbolic. Strict Listerism proved to be a great prophylactic.—*Arch. f. klin. Chirg.* 1886, Bd. 33, Hft. iii.

W. BROWNING (Brooklyn).

**II. The Pathological Action of Corrosive Sublimate.** MM. CHARRIN and ROGER. From several experiments performed on guinea-pigs by the hypodermic injection of bichloride of mercury solutions, the above observers found that when the dose was considerable, hæmorrhages into the intestinal wall were liable to be produced. The cæcum and ascending colon were the parts most affected, although occasionally the end of the small intestine was involved as well as the

large. Albuminuria and progressive wasting were the chief symptoms noticed during life.

It is asserted that a dose of 24 centigrammes (nearly four grains) is required to produce ulceration of the intestines in a full-grown man, but knowing the great susceptibility to the influence of mercury which some patients exhibit, this statement must be accepted with caution. In the animals experimented on, small spots of hæmorrhage were also found in the omentum, on the outer surface of the kidneys, and into the substance of the lungs. The ultimate result of the sub-mucous hæmorrhage was the formation of a black eschar, which sloughed away leaving an ulcer.—*Brit. Med. Jour.*, 1886. Oct. 9.

J. HUTCHINSON, JR. (London).

#### VASCULAR SYSTEM.

**I. Aneurism of the Abdominal Aorta Treated by Introduction of Wire into the Sac.** By F. LANGE, M. D. (New York). The patient, a man, æt. 45, was originally treated for syphilis with no effect. Finally, Loreta's operation was decided upon, viz., the introduction of wires into the sac after laparotomy; the aneurism, however, enlarged very rapidly both in the epigastric and lumbar region about the right kidney, and one morning it became apparent that the blood had effused behind the peritoneum and in front as far as Poupart's ligament; the aneurism had become very greatly enlarged, and the patient very anæmic. An improvement upon the operation of Loreta was then performed, a needle being passed through the viscera in the epigastric and lumbar region into the sac and three metres of thin wire introduced through it; the patient did not need any anæsthetic, and the operation caused no disturbance. The swelling in the epigastric region gradually diminished, and in the lumbar region it became harder; a few days later a swelling appeared near the liver; the needle was again inserted at that point and just above Poupart's ligament; in all, 12 metres or about 30 feet of wire were introduced; a solution of chloride of sodium was then infused into the cephalic vein, the patient bearing it well, but the aneurism gradually increased. A second infusion a few days later caused slight improvement, but all further

efforts were suspended, the patient dying of pneumonia twelve days after the first operation. The autopsy showed that in one case coagulation had occurred about the substance, but in the others the wires were clean; Dr. Lange did not think coagulation was bound to occur but, where previously there had been a strong pulsation, two days before death that pulsation was hardly perceptible, and the bruit had disappeared; if the case had been taken earlier he believed that rupture of the sac could have been prevented and a cure effected even in so severe a case.—*N. Y. Surg. Society*, Oct. 25, 1886.

**II. Supposed Aneurism of the Obturator Artery. Sudden Disappearance.** By F. LANGE, M. D. (New York). In case of a man *æt* 21, the subject of an old osteomyelitis of the ilium with a resulting ankylotic mass at the hip-joint, there was developed immediately below the inner half of Poupart's ligament a slight, but distinct elevation, extending some inches down and situated a little nearer to the adductor side, with a distinct pulsation and bruit; the femoral artery could be traced on the lateral edge of the swelling, but compression of this artery above Poupart's ligament did not seem to have any effect on the pulsation. Strong pressure on the tumor, deep toward the obturator foramen, caused the pulsation to cease. Dr. Lange was not quite sure that a large artery which he felt and compressed through the rectum was the obturator artery; its isolated compression seemed not to have any effect on the tumor [he afterwards modified this statement by saying that at a certain point when pressure was made, the pulsation stopped entirely], but simultaneous compression of the external iliac seemed to stop it, or at least to considerably diminish it. He was inclined to assume that it was an aneurism furnished principally by the obturator artery, but probably also communicating with the femoral or one of its main branches. He thought that possibly a small spiculum of bone might, by gradual erosion of the obturator artery have caused the aneurism.

H. B. SANDS, M. D. (New York), remarked that it seemed clear that if this tumor is an aneurism, it is not one of the usual kind, *i. e.* not one of the femoral artery, but one involving some branches



of the internal and external iliac and fed from a double source; in which case the treatment would be different from that commonly applied to aneurisms occupying this situation. Under these conditions, an operation involving the internal iliac might be necessary. At first, however, pressure in the rectum upon the internal or common iliac should be tried. If operative procedure were decided upon, ligature of the common iliac artery might prove necessary; if he had such a case, he would not postpone operation very long. He would very much dislike to open such an aneurism and he had no faith in treatment by medicine.

R. F. WEIR, M. D. (New York), calling attention to the fact that deep pressure at one point arrested pulsation, would first try external compression, having not long since cured a case of vertebral aneurism by compression under similar circumstances, to which Dr. LANGE remarked that the pressure in this case would have to be so intense that he thought the attempt would have to be made under chloroform; if this should prove a failure, he would prefer to tie the obturator artery first, fearing that the anastomosis might not be perfect enough to supply blood to the limb in case the common iliac were tied. It seemed to him on his first examination that a large vessel inside of the pelvis, probably the enlarged obturator, was the principle feeder of the aneurism.

L. A. STIMSON, M. D. (New York) thought the youth of the patient would give weight to the opinion that the aneurism was probably a pouched sac formed after wounding of the vessel, which would be suited to treatment by coagulation of its contents induced by the introduction of coagulating substances, solid as well as fluid, such substances having been introduced in intra-thoracic and abdominal aneurisms without causing any serious reaction, although the patients had usually died from the progress of the disease; if compression failed, he would prefer such treatment to ligature of the common iliac.—*N. Y. Surg. Society*. Oct. 25, 1886.

At the next meeting of the Society, the patient was again presented with the history that during the night after he had been examined by the members, the swelling had disappeared and never returned. Dr.

LANGE remarked that there was no question of the existence of the tumor at the time, and the only plausible explanation of the condition was that of a sudden obstruction of the main vessel. Dr. SANDS could not otherwise explain the occurrence. A similar occurrence happened about twelve years previously in a man who had a well-marked pulsating aneurism of the left axillary artery and who complained of a sudden pain in his left arm, whereupon it was found that no pulsation could be felt in either the radial or the ulnar artery of that side, on account, it was supposed, of a large clot having been displaced from the sac and lodged in the upper part of the brachial artery. The aneurism ceased to pulsate and at the end of six weeks was entirely cured.—*N. Y. Surg. Society*, Nov. 8, 1886.

## HEAD AND NECK.

**I. Exsection of Temporo-Maxillary Joints for True Ankylosis.** By A. G. GERSTER, M. D. (New York). In a semi-idiotic girl *æt.* 15, suffering from ankylosis of the jaw of some years standing, consequent upon a long-continued feverish illness with an abscess connected with one cheek, sufficient data for the diagnosis of true ankylosis, were not available, and it was decided to cut the upper insertion of the left masseter and eventually proceed to exsection of the left joint, where the origin of the disease was suspected to have been located, on account of atrophy of that side of the face, atrophy as a sequel of inflammation being a plausible supposition. An incision along the lower edge of the zygoma permitted a division of the muscle, which was not followed by any improvement of the functional defect. Therefore a vertical incision was added to the posterior end of the first incision, a triangular flap being thus raised, and the joint was exposed with some difficulty. This was due to the atrophy and smallness of the head of the inferior maxilla, which was found together with the glenoid cavity, bare of cartilage. The head was removed with the chisel, without any trouble or mishap, but the immobility of the jaw remaining unchanged, it became evident that the principle trouble was located on the right side. On account of the duration of the operation, it was decided to postpone the exsection of

the right temporo-maxillary joint. The wound healed promptly. Twenty-six days later, a horizontal incision of  $2\frac{1}{2}$  inches was carried from the external meatus of the right ear forward along the zygomatic arch. The temporal vessels being doubly tied were severed; and, the region of the joint being exposed, it was found that a solid and rather massive and bony union of the head and coronoid process with the temporal bone had formed, this mass exceeding the normal width of the bone by about half an inch. A wedge of very hard ivory-like bone being removed by the chisel, the jaws could at once be separated freely, the distance between the incisors being 4 cm. This wound was also healed twelve days after, and the jaws could be separated by the patient herself to a distance of 3 cm. Chewing was practiced without difficulty, and the function is excellent to this day. Regarding the causation, the presence of an inflammatory process is indubitable as an important element, probably in the course of a typhoid fever or acute inflammatory rheumatism. Whether the hemiatrophy was due to the presence of the ankylosis is very doubtful, but it seems rational to assume that the atrophy of the temporo-maxillary joint of the left side was caused by the absence of the physiological stimulus of motion in the joint. The operation is rational and safe, and has yielded excellent result to other observers abroad as well as at home. The horizontal incision as devised by Bottom and König has been found to be the better one, although ligature of the temporal artery cannot always be obviated.

F. LANGE, M. D. (New York) had operated upon a girl, æt. 8, with ankylosis of the jaw after scarlet fever and diphtheria with a consequent otorrhœa and later, measles. At times, the teeth could be more easily separated, when hearing also seemed to be improved. The lower jaw was abnormally small and the left half of the bone seemed shorter than the right, on which side the muscles seemed the more active. From this, thinking the left jaw was the one affected, the joint was exposed by the horizontal incision and not a trace of the articulation could be seen, everything seeming to be changed into one bony mass which had to be chiseled, strictly subperiosteally, away piece by piece. At the end of ten days cicatrization was complete, and the

jaw could be opened about a centimetre, which increased after about six weeks to about  $1\frac{1}{4}$  inches.

In the case of a child, æt. 6, during birth the blade of the forceps had caused, by pressure, gangrene of the soft parts above the articulation with consequent complete ankylosis. The jaw was less developed than normal. Both joints were excised and also the left coronoid process, since it interfered with movement by striking against the zygoma. The result was good, but the patient died three years later from tuberculosis.—*N. Y. Surg. Society*, Oct. 25, 1886.

JAMES E. PILCHER (U. S. Army).

**II. Abscess of Brain Following Compound Fracture of Skull. Drainage. Recovery.** DR. W. O. MAHER (Australia). The patient in this most interesting case was a girl, æt.  $4\frac{1}{2}$ , who had sustained a severe compound fracture of the frontal bone on the right side. The removal of some necrosed portions of bone led subsequently to slight hernia cerebri. A sinus persisted, but the child seemed well in other respects until about five months after the accident, when left-sided convulsions (chiefly of the muscles of face and arm) came on, and an alarming condition rapidly developed. The sinus was opened up and a director was passed for a distance of one inch into the right frontal lobe downwards and backwards. A free flow of foetid pus occurred, and after the cavity had been washed out with carbolic solution (1 in 40), a drainage-tube was inserted. The latter was removed at the end of a fortnight. Left hemiplegia followed the operation, but it passed off some twenty-four hours subsequently. Recovery was rapid and complete.

Dr. Gowers and Mr. Barker (*British Medical Journal*, December 11, 1886) have lately recorded a case of successful drainage of an abscess in the temporo-sphenoidal lobe following suppurative otitis, which appears to be the first on record. Mr. Hulke, however, in 1879 trephined for cerebral abscess (after an injury), and has also recorded in the *Lancet* of 1886 three cases similar to Dr. Gowers's, in which, however, a fatal issue followed the operation in each.

Dr. Maher's case is reported in the *Australian Medical Gazette*, Dec., 1885.

J. HUTCHINSON, Jr. (London).

**II. On the Origin of Ranula From the Bochdalek Gland-tubes of the Root of the Tongue.** By Prof. E. NEWMANN (Königsberg). Some years since N. reported a case where the lining of a ranula was covered by ciliated epithelium. The ciliated cells were long and rested on a layer of small round cells. Recently von Recklinghausen has published a very similar case. N. is now able to add a third case, though from a poor preparation.

Recklinghausen concluded that such cysts develop from the Blandin-Nuhn gland under the tip of the tongue, though this gland does not normally present ciliated epithelium. Newmann argues at length against this view and in favor of his own, that they originate from the only oral structure bearing ciliated cells, viz., Bochdalek's gland.—*Arch. f. klin. Chirg*, 1886, Bd. 33, Hft. iii.

**IV. On the Causation of Fractures of the Larynx.**—By Prof. E. von HOFMANN (Vienna). After relating and discussing several cases, the following conclusions are given:

1. Fractures of the larynx, particularly of the large horns of the thyroid cartilage and the bridge of the cricoid may, where these structures no longer possess their youthful elasticity, arise from strangulation, throttling with the hand and various other kinds of direct force.

2. Indirect force also, involving compression of or strain on the larynx, may occasion such fractures.

3. Indirect fractures may arise further, from cutting through the front of the neck if the instrument be too dull or a calcified larynx is met with—or from falling from a height, especially when striking on the head.—*Wien. Med. Woch.*, 1886, Nos. 44 and 45.

**V. Tracheotomy in Diphtheria.**—SOCIN and KESER report 12 cases (10 of crico-tracheotomy and 2 of superior tracheotomy), with 7 recoveries and 5 deaths. The patients' ages ranged from  $2\frac{1}{2}$  to 6 years, the youngest recovering. Salicylic spray was regularly used in the after-treatment.—*Jahrsbericht d. Spital zu Basel* f. 1885.

**VI. Fibroma of Vocal Cord.** SOCIN AND KESER.—The patient was a woman, æt. 44. Increasing hoarseness for one and a half

years, and an expectorating cough for two weeks were the only symptoms. Laryngotomy. Tamponade of trachea. Excision by scissors of a small pea-sized tumor from the front third of the left vocal cord. Seried suture. Cure with normal voice.—*Baseler Spital Berecht. f.* 1885.

## ABDOMEN.

### I. Gastrostomy with Double Stricture of the Œsophagus.

By Dr. B. SCHLEGTENDAL (Hannover). The patient was a woman, æt. 24, who four years previously had suffered from severe diphtheria of the throat. Since that time gradually increased difficulty in swallowing. She claimed not to have been able to swallow anything the last week; everything stuck in the throat, and was immediately gagged up. Fluids returned so quickly and completely that they could not have passed down any distance. The finest sound even did not go beyond the aditus laryngis. The obstruction was evidently high up. She was excessively emaciated; no other cause than inanition. Nutrient enema for two days made no objective impression on her condition.

The operation was difficult; stomach stitched to the abdominal opening; morphine injected. That afternoon and during the remainder of life she vomited up an abundant quantity of fœtid, dirty, gray-brown fluid. Rectal alimentation continued. Her failing condition necessitated opening into the stomach a day after the first operation. This viscus was filled with thick fluid, gall-green material in contrast to the vomit. The stomach was washed out, when strong bouillon was well tolerated. A few hours later her condition grew worse, and despite further stimulating, death ensued 45 hours after the first operation.

The autopsy showed that union had taken place between the wound edges of stomach and abdomen. No other sign of peritonitis than slight fluid in abdomen. The fauces narrowed just back of the epiglottis to a funnel with a closed bottom. No passage from above could be found through the cicatricial stricture, though from below a fair sized sound could be passed up through. Below this the œsophagus widened into a broad fusiform dilatation. This still contained



considerable material like that vomited. A second stricture, quite like the first, existed at the cardia. This also admitted no sound from above, though readily from below. The vomiting of material unlike the stomach contents was thus explained. No history of syphilis. The origin of the lower stricture was not clear. In such a case œsophagotomy would be quite out of place.—*Arch. f. klin. Chir.*, 1886, Bd. 34, Hft. iii.

W. BROWNING (Brooklyn.)

**II. Laparotomy as a Diagnostic Resource.** By T. GAILLARD THOMAS, M. D. (New York). After an experience yielded by seven or eight hundred cases, approximately, of laparotomy for various causes, extending over a period of twenty-three years, the author is sure he can say with entire truth that he has never once regretted opening the abdomen, and that he has in a dozen cases at least, deeply regretted having failed to do so. It is in his mind certain that in the future, explorative abdominal incision will become the rule in all cases of the following conditions, which do not yield to medical means, and concerning the etiology of which there is great doubt: (1). Wounds and injuries of the abdominal viscera. (2). Intestinal obstruction. (3). The presence of stones in the gall-bladder or kidneys. (4). The accumulation of blood, pus or serous fluid from any cause. (5). The existence of a neoplasm in any part of the abdomen. (6). The occurrence of serious organic changes in certain of the viscera of the abdomen, such as the kidneys, the uterus, the Fallopian tubes, the ovaries or the spleen. (7). Ectopic gestation. After the recital of several cases, showing the disadvantages of non-interference and the beneficial effects of the more active measures, he dwells particularly upon the operation in *ascites of the female* due to the existence of neoplasms within the peritoneal cavity; some cases of excessive ascites, which by repeated tapplings prove fatal, are due to insignificant uterine or ovarian tumors, which are too small for recognition, unless specially and carefully sought for, and the removal of which relieves the fluid accumulation which by its exhausting influence destroys life. These tumors are sometimes no larger than small ap-

ples, and cannot be recognized except by the careful examination of an expert. In stout women, or even in those that are thin, after accumulation of ascitic fluid, they cannot be discovered even by a master in diagnosis. It is very difficult, indeed impossible, to tell why in a certain small number of cases these tumors create ascites, while in others they may occupy the peritoneal cavity for years without causing any such trouble, but that such is the fact is beyond question. He presents five cases in the belief that, resting upon them, he may assume the position that in case of ascites in the female, before the patient is relegated to the usual practice of repeated tapping with its universally barren results as to cure, the most thorough investigation as to the possible existence of small neoplasms as important pathological factors should be made, and if signs of their existence be obtained, explorative incision should be practiced as a forlorn hope that relief may be obtained by their removal. In closing, he notes two points, the first is the singular and to him inexplicable fact that in certain cases of abdominal incision in which diagnosis only is practicable, and in others in which removal of the tubes and ovaries proves to be impossible, great improvement sometimes results to the patient's general and local constitution from the explorative effort alone. The second point is the necessity for the observance of certain rules, viz., (1). Every explorative incision should be made under the strictest antiseptic precautions; as to strict cleanliness, all are agreed; if antiseptics of chemical character are valueless, they at least in all probability do no harm; while the question as to their utility is *sub judice*, give the patient the benefit of the doubt and employ them. (2). Always employ an anæsthetic, lest the complaints of the patient should frustrate the investigation or render it superficial and uncertain. (3). Always make an incision which will admit the whole hand; one which will admit two fingers only is hardly warrantable; if possible, let but one man's hand be passed into the abdominal cavity. In a multitude of council, there is in these cases danger. The brain which guides the hand should be competent to decide the question at issue. (4). Never hurry an explorative incision, but never prolong one unnecessarily. Let discussion as to diagnosis occur after the peritoneum is

closed, not while it is open, and let the fact be appreciated that the clinical lecture, which is so common at this moment, is always a source of great danger.—*Med. News*, Dec. 11, 1886.

**III. Gun-shot Wounds of the Intestine.** By W. S. TREMAINE, M. D. (U. S. Army). In opening a discussion in the New York State Medical Association, the writer, after noticing the meagreness of text-book information on this subject, remarked that the calibre of the ball, the proximity of the weapon and the position of the wounds of exit and of entrance have an important bearing. As regards general symptoms, the existence of prolonged shock, a lowered temperature, a feeble pulse, great restlessness, marked anxiety of countenance, accompanied by tympanites and great pain, taken in connection with the anatomical location of the wound, afford very strong evidence of a perforating wound of the intestine. The escape of blood from the anus rarely happens soon after the injury, and is consequently of little value as a diagnostic sign. Incision in the median line is proper for exploratory purposes: (1). Because the intestines may be wounded. (2). In any event, it is in nine cases out of ten required for the removal of effused blood which it is dangerous to allow to remain. (3). The abdominal section adds but little, if any, danger when done with proper precautions. (4). The assurance which may be given to the patient that his intestines have not sustained a fatal wound, which cannot but have a marked tonic effect conducive to recovery. Perforation of the intestines is an unquestionable indication for the performance of laparotomy with enterorrhaphy, since it is doubtful if there is any well authenticated case of recovery after a perforating gun-shot wound of the intestines with fæcal extravasation, while we have the positive evidence in favor of laparotomy of the cases of Bull and Hamilton (in Vols. i, ii and iv of the *ANNALS OF SURGERY*). The operation having been decided upon, it should be done as soon as possible after the receipt of the injury for the following reasons: (1). It is believed that the first effect of the injury is to paralyze temporarily the peristaltic action of the bowels, thus for a time preventing fæcal extravasation. (2). It is obvious that moving the patient, if it does not overcome this, will tend to displace mechan-

ically some of the contents of the intestines. (3). If intra-abdominal hæmorrhage is going on, it will not be likely to stop spontaneously; moving the patient will not, it is certain, conduce to the arrest of hæmorrhage, if it exists. (4) Delay increases the chances of peritonitis, thus bringing secondary troubles to add to the primary one, already grave enough. Whenever practicable, however, it is believed that the dangers of removal will be counterbalanced by placing the patient where the sanitary surroundings are good and where skilled assistance and sanitary appliances can be had.

With regard to the battlefield, where it is obvious that the greater number of gun-shot wounds occur, the difficulties of immediate laparotomy amid the smoke, dust, haste, confusion and pressing demands upon the time of the military surgeon in actual hostilities, will not at any rate be easy to overcome, although they may not be found insurmountable in the future; the modern rifle bullet weighing 500 grains or more, must inflict a considerably more serious wound than the small pistol bullet of 22 or 32 calibre which has caused the wound from which recovery has been obtained. In the light of present experience, it would seem the better practice to wait until the wounded man can be carefully removed to a division hospital, in the meantime occluding the external wound or wounds by some convenient form of antiseptic pad.

The Lembert suture is recommended for intestinal wounds. For occluding the lumen of the intestine above and below the injured part, in case resection is demanded, the writer had found the ordinary spring clothes-pin, slightly altered, as it may be in a few minutes to answer the purpose. It is suggested that as a precaution against the escape of blood and the contents of the intestine into the peritoneal cavity, the portions of the intestine to be operated upon be drawn through an opening in a piece of the thin india rubber dam of dentists. As the bowel derives its blood supply from the mesentery, it is important, in order to prevent gangrene, to preserve the mesenteric attachment as far as possible. When necessary, a V-shaped portion of the adjacent mesentery can be removed, and this wound closed by the continuous catgut suture. With regard to the amount of intestine to be removed with safety, Baum's patient who died from progressive

emaciation six months after recovery from the resection of 137 centimeters of small intestine, would seem to indicate that there is a limit to the amount that can be removed without impairing the patient's health. The paper closes with a case of stab-wound of the abdominal wall, the skin of which only had been sutured by a physician who ordered a grain of opium hourly. On admission to hospital, nine hours later, the gut was found protruding through the abdominal wall and distending the skin. Laparotomy and the removal of about a pint and a half of clotted blood from the abdominal cavity which was thoroughly irrigated antiseptically. The closure of the accidental and operation wounds and careful antiseptic dressing did not save the patient, who never rallied. Having taken eight grains of opium before the operation, it was doubted whether he died from opium narcosis, from the wound or from both combined.—*Med. News*, Nov. 27, 1886.

**IV. Diagnostic Signs of Involvement of the Intestine in Shot-wounds of the Abdomen.** By JOSEPH D. BRYANT, M. D. (New York). The signs of intestinal involvement are divisible into two classes: (1). Those referable to the abdomen itself, or local signs. (2). Those referable to the constitutional effects of the injury, the constitutional or general signs. Considering the local signs, the direction of the wound, the character of the discharge from it, and emphysema of its borders or of the neighboring connective tissue are all of importance in a diagnostic sense. The direction of the missile is an important though not a positive sign. In case of hæmorrhage, if the bleeding points found in the abdominal wall do not account for the entire loss of blood, the evidence of intra-abdominal hæmorrhage, dependent on intra-abdominal involvement, is conclusive. Bloody stools at a period near that of the injury will serve to confirm the belief that may exist of intra-abdominal involvement. The escape of intestinal contents from the abdominal wound is positive proof of involvement of the intestine, but as the extravasated fluids are quite easily retained in the abdomen, this is infrequently seen as an immediate sign. While early emphysema of the abdominal wall surrounding the wound, which has been considered by some writers as a certain sign of intestinal perforation when associated with a suspected ab-

dominal wound, is generally such a sign, yet a circumscribed subcutaneous emphysema may take place around non-penetrating wounds. Pain, tenderness and retention of urine are signs of common occurrence. The substitution of tympanitic resonance for normal hepatic dulness may be considered an almost pathognomonic diagnostic sign of even a small amount of air in the peritoneal cavity, though it may be due to adhesions of the intestine to the abdominal wall in this situation, to a distended colon pressing firmly against the under surface of the liver and to distension of the colon, accompanied by a diminished area of hepatic dulness due to a contracted liver. Percussion of the abdominal wall may elicit an abnormal line of dulness due to fluids in the abdominal cavity. The constitutional or general signs having a recognized bearing on the diagnosis of intestinal involvement are shock, nausea, vomiting and hiccough. While the gravity of the shock may depend either upon the degree or upon the idiosyncrasy of the patient, yet severe shock at the beginning may be considered as almost diagnostic of a profuse hæmorrhage or an extensive visceral involvement. Intense thirst, constant wakefulness, excessive restlessness and great anxiety are manifestations of intestinal involvement. All of them are associated more or less intimately with shock, and the first of them with the initial processes of a consequent peritoneal inflammation.—*Med. News*, Nov. 27, 1886.

**V. The Circumstances under which and how soon after the Injury, Laparotomy should be resorted to in Shot Wounds of the Abdomen, and when the Operation is Contraindicated.** By WILLIAM T. BULL, M. D. (New York). Considering it settled that laparotomy is the best treatment for shot-wounds of the intestine and that it is generally indicated, the surgeon is brought to a standstill by the fact that many cases present few or none of the diagnostic symptoms of intestinal involvement; it is often impossible to ascertain by the usual exploration with probes whether a wound of the parietes be penetrating or not; and even when the intestine has been perforated, positive symptoms of the injury are often wanting at the outset; again, if laparotomy be delayed until the symptoms have made the diagnosis, it will be undertaken with very much diminished



chances of success. With the one exception then of cases where the wound is situated in the posterior wall of the abdomen or in the lateral wall covered by the lower ribs, and there is no evidence of any wound anteriorly—where enlargement of the wound of entrance would not permit a satisfactory inspection of the cavity, and there are many chances of the missile being lodged in the thick layer of muscles or deflected by the ribs—and the single contraindication of profound and prolonged shock, the writer is convinced that the surest, safest and quickest way of dealing with shot-wounds of the abdomen is first to assure one's self by exploration of the wound of entrance that the cavity has been entered or the gut injured, and then to repair that injury by laparotomy. A penetrating wound enlarged to two or three inches in length will permit the inspection of the viscera in the neighborhood and the examination of other parts with a sponge or the finger. In the further exploration of the viscera, section in the median line is preferable; as a general rule, it is believed that it will be safer in the aggregate of cases to perform laparotomy when the wound is found to be penetrating, even if the cavity be tolerably clean. He reports eight cases in three of which laparotomy was performed, with one death and two recoveries; the latter may be found in detail in the *ANNALS OF SURGERY*, vol. i., p. 479 and vol. iv., p. 468. It was remarked that the subject of the first operation is living after two years, and in good health. The unsuccessful case occurred in a muscular mechanic of intemperate habits, æt. 24, who was shot in the back ten minutes before admission to the hospital, the bullet, of 44-calibre, entering  $1\frac{1}{2}$  inches to the right of the spine, on a level with the last rib, and could be felt anteriorly beneath the skin  $1\frac{1}{2}$  inches to the right and 2 inches above the umbilicus. Pulse 62; resp. 22; temp. 98°. Severe abdominal pain; surface pale and extremities cool; an hour later the contents of the stomach were vomited. Five hours later he was still pale but warm; had severe pain. Pulse 92; resp. 35; temp. 98. Hepatic dulness diminished but not absent; abdomen not swollen, tender about bullet; left lumbar region resonant, right dull—dulness differs on turning to the left side (bloody fluid in cavity). The bullet was removed by a three-inch incision and the finger passed into the cavity; considerable

bloody serum followed its withdrawal, the latter thought by some to be of faecal odor; no faeces. The abdomen was then opened in the median line from three inches below the sternum to two inches above the pubis—eleven inches. One or two pints of bloody serum and clots were turned out, four perforations, two of the jejunum and two of the transverse colon were sutured with Lembert's suture; the stomach, liver and spleen were inspected and the intestines and cavity thoroughly washed with carbolic acid solution (1%). The posterior wound was covered with iodoform compress. In holding the small intestine out of the wound, a vein in the gastro-splenic omentum was torn but firmly secured with ligature. The point of entrance of the bullet was not detected. The tissues of the ascending mesocolon were stained black with extravasated fluid. The operation lasted  $1\frac{3}{4}$  hours; at its close the pulse was 125 (small); resp. 42. Reaction was imperfect, and death ensued at the end of eight hours. The autopsy did not disclose the point of entrance into the abdominal cavity. In the retroperitoneal tissues, about the kidney and ascending colon, was extensive extravasation of blood. Kidney uninjured; some bloody serum in the cavity. The wounds were tightly closed, and no others were found. The remaining five cases were not subjected to operation. All were fatal, but were shown by autopsy to have been well adapted to operation and were the means of convincing the author of the advisability of laparotomy for the relief of these accidents. In reviewing the contraindications to laparotomy, the writer rejects peritonitis in view of the fact that it is no longer considered an obstacle to operations for the removal of tumors nor for intestinal obstruction, and that it has been cured by laparotomy with irrigation and drainage; this leaves profound and prolonged shock and those conditions which determine it, such as wounds of the solid viscera, as the only contraindications.

THEODORE R. VARICK, M. D. (Jersey City) remarked that the indications for treatment were based on the recognition of the various factors leading to death, which are, primarily shock and hæmorrhage, and secondarily peritonitis resulting from the wounds and the extravasation of intestinal contents into the peritoneal cavity, which, if life be

sufficiently prolonged. terminates in sepsis. The gravity of these wounds is modified by location and size, whether affecting the large or small intestine or. inflicted from behind, opening the gut where it is uncovered by peritoneum, and whether it is a simple or multiple perforation or complicated by the opening of an artery or vein. The contraindications are only such as would foreshadow the rapid approach of dissolution, when the operation would be absolutely useless. Shock, to a greater or less extent, accompanies all shot-wounds, but when taken in connection with gradually increasing evidence of exhaustion, such as rigidity and feebleness of pulse, jactitation, sighing respiration and sinking temperature, indicating intra-abdominal hæmorrhage and in cases in which in addition is found dulness at the more dependent portions of the abdomen, with tympanitic distention of the anterior portion, immediate laparotomy is clearly indicated, that the bleeding vessels may be tied and the extravasations removed. He would give the patient the benefit of a chance, no matter how small, against an almost absolute certainty of death.—*Med. News.* Nov. 27, 1886.

**VI. The Essential Features of the Technique of Laparotomy, Including the Management of the Wounded Intestine.** By JOHN B. HAMILTON (Washington, D. C.) The first question in case of a shot-wound of the abdomen is whether the abdominal cavity has been opened; to settle this the writer advocates the use of the probe; restricting its use, however, to small pistol-shot-wounds and using a flexible probe which can do no harm; the only danger in using a probe is in using too small a one. He considers the operation indicated whenever the surgeon believes the intestine has been perforated and as early as possible; and contraindicated after the lapse of forty-eight hours from the time of injury and where the patient is in a state of collapse and peritonitis present. The technique of the operation does not differ from that of any other laparotomy, except as to the management of the intestine; as a matter of course, the usual antiseptic precautions are to be taken and hot towels placed over the chest, stomach and intestines; on opening the abdominal cavity, first look for bleeding vessels, carefully examining the omentum and tying all bleeding points, attending to the slightest abrasion of the mesen-

tery with great care. The intestines should be drawn out loop by loop with the finger, which is better than instruments for this purpose. As the intestines are drawn out lay them on a hot towel and cover them with another one wrung out in hot sublimate solution. When the wounds are found, stitch them up as fast as possible, but be careful not to wound the mucous membrane; the Lembert suture is preferable for this purpose, using catgut of small size, cut short; the closure of the abdominal incision is effected as in laparotomy for other purposes, the peritoneal cavity having been previously thoroughly cleansed.—*Med. News*, Nov. 27, 1886.

**VII. The Best Methods of After-treatment in cases of Gun-shot Wounds of the Intestine, where Laparotomy has been Performed.** By CHARLES B. NANCREDE, M. D. (Philadelphia). The subject should be considered under three heads, (1) where peritonitis does not exist at the time of operation; in other words, when a primary operation has been performed; (2) when incipient peritonitis exists at the time of operation, and (3) when, despite all our efforts, or due to some defect in technique, peritonitis develops after the operation. In all cases, antiseptic methods should be continued. (1') Under the first condition, a recumbent position with the knees flexed, seldom changed, and then not by the patient's efforts, should be insisted upon; alimentation exclusively by the rectum should be the rule for at least twenty-four hours, when possible, and in some cases even longer; at the most, cracked ice and small quantities of beef peptonoids should be given when the rectum rejects enemata or when feeding by the mouth is begun: in case of extensive tympanites, rectal injections and enemata should be tried. (2') In case of incipient peritonitis, with the probable formation of large quantities of acid septicæmic or sapræmic serum, precisely as in similar conditions after ovariectomy, drainage should be instituted, the tube, when possible, being of glass with the end kept well down into the recto-vesical or recto-vaginal cul-de-sac; a free or purulent discharge indicates antiseptic irrigation with a weak bichloride or boracic acid solution. (3') In peritonitis developing after the operation, the initial treatment

depends on whether the onset is gradual or sudden; in the latter case, if there be evidence of shock, as occurs at times from vaso-motor paralysis, shown by an apathetic conscious condition, with extended limbs, pinched features and a weak pulse, opium in large doses will prove fatal, but small doses of morphia with atropia will stimulate the heart. In case of later development of hypostatic pneumonia, stimulants and revulsives are indicated. In the gradual variety, freedom from pain obtained preferably by morphia hypodermically is the ideal condition. In the latter stages of peritonitis, especially when the heart and lungs fail and when gastric regurgitations and hiccough are rapidly exhausting the patient's vitality, one or more hypodermic injections of atropia, either alone or in combination with morphia, digitalis, ammonia or alcohol, will at times save an otherwise hopeless case. Free leeching early in an attack and the ice-coil to the abdomen are recommended as means of controlling peritonitis. In case of peritonitis with suspected septic intoxication, the reopening of one angle of the wound and providing antiseptic irrigation and drainage will save some otherwise fatal cases. The writer is opposed to operating in case of advanced peritonitis, because of the difficulty of, and prolonged manipulation in finding the wounded bowel, and neither free drainage nor an effectual toilet of the peritoneum could be secured.—*Med. News*, Nov. 27, 1886.

**VIII. Gun-Shot Wounds of the Intestine.** By CHARLES T. PARKES, M. D. (Chicago). In concluding the discussion, a brief of which is given in the five preceding abstracts Dr. Parkes remarked that sufficient data had not yet been offered upon which to base a diagnosis. In running rapidly over the various points of the discussion, he called attention to the desirability of considering the distance, shape and calibre of the bullet, and the obliquity with which it enters, relating a case of a thief shot with a 44-calibre pistol in the back; the next morning he went to the hospital, where it was found that the ball had entered the back about four inches from the spinal column and emerged near the umbilicus; he never developed any serious symptoms, and left the hospital on the second day. Every surgeon should go to a case of gun-shot wound of the abdomen prepared to operate

at once, on the spot if possible, and enjoin absolute rest. The incision should always be made in the median line; in emphasizing this point, he related two cases of lateral incision; the autopsy of the first one showed fecal matter and blood which had not been discovered by the operator. In the second case the man was sinking from hæmorrhage, and the bleeding vessel could not be found, but was traced to the opposite side of the body and could not be uncovered, and the patient died. He called attention to the necessity of care in fastening the wounds; they should not be made too tight or sloughing will occur. If the peritoneal surfaces are held together for a few hours they will firmly adhere together. —*Med. News*, Nov. 27, 1886.

**IX. Explorative Laparotomy in a Case of Intestinal Obstruction; Ovariectomy and Cure.** By C. R. REED, M. D. (Middleport, Ohio). A married woman, æt. 34, the mother of seven children, had suffered from obstinate constipation with, for four days, constant vomiting which had been stercoraceous for the last forty-eight hours and, in the presence of imminent dissolution, an explorative laparotomy was performed. The abdomen was enlarged and irregular, a condition which was attributed to fecal accumulation, but, on abdominal section, a hitherto unsuspected cyst of the left ovary was discovered with adhesions to the abdominal wall and also to the descending colon. The former were readily broken up, the latter with difficulty, and these were believed to be the cause of the obstruction of the bowel. The cyst was removed and the wound closed; the patient rallied well, vomiting ceased and the bowels moved spontaneously on the eighth day; the patient passed on to a satisfactory recovery in spite of an intercurrent attack of capillary bronchitis, menstruated after the third month and at the time of writing of the paper was two months pregnant. — *Jour. Am. Med. Ass'n.*, Dec 4, 1886.

**X. Strangulated Hernia and Herniotomy.** By P. S. CONNER, M.D., (Cincinnati, Ohio). Professor Conner furnishes an analysis of 33 herniotomies with remarks upon the treatment of strangulated hernia. Of these cases, 12 (6 males and 6 females, 36.4%) re-



covered ; 21 (14 males and 7 females, 63.6%) died. Of the former, in but 3 had the strangulation existed more than twenty-four hours ; of the latter, in but 2 had it existed less than that time ; in the remaining 19 its duration had been in 2 seven days, in 2 over six days, in 1 four days, in 4 over three days, in 4 over two days, in 4 more than thirty-six hours, and in 2 more than twenty-four hours. Of the 33 herniotomies, 20 were done upon men, 13 upon women ; 17 for inguinal ruptures, with 4 recoveries ; 15 for femoral, with 8 recoveries, and 1 for umbilical, fatal. The youngest person operated upon was 20, the oldest 83 years of age ; the former dying, the latter getting well. Two of the patients were between 20 and 30 years old, 4 between 30 and 40, 13 between 40 and 50, 6 between 50 and 60, 6 between 60 and 70, 1 between 70 and 80, and 1 over 80. Of those that died, 1 lived thirty-eight days (dying of a low grade of septic fever), 1 fifteen days (dying of tetanus), 1 nine days (dying of pneumonia), 1 five days, 3 less than four days, 3 less than three days, 5 less two days, and 6 died within twenty-four hours, 2 of them in less than one hour, being *in extremis* at the time of operation. In 3 cases the bowel was gangrenous when exposed, having been strangulated respectively seven, six and three days. In one case, though the strangulation had lasted but six hours, three bloody stools were passed after the operation, and, on autopsy, much coagulated blood was found in the intestine below the level of the upper constriction, due possibly to injury done during the efforts at reduction made before the man was admitted to the hospital. This was one of two cases in which there was paralysis of the constricted part of the bowel, continuing up to the time of death, two and half days after the operation was performed. In one case there was congenital absence of the right half of the scrotum with retention of a much flattened and wasted testis in the inguinal canal ; the hernial pouch pushed out toward the iliac spine. In another case, the hernia had descended to the right labium, the right ovary being below it in the labium. This is the only case of inguinal hernia in the female among those operated upon. Three of the herniotomies were for femoral rupture in the male, the sac contents in two being intestine, in the other omentum. Speaking generally it is the delay in

operating that kills, not the operation. In the 33 cases under consideration, but one death was attributable to the operation, that by tetanus, a rare complication. The writer strongly emphasizes the necessity of early operation and the danger of prolonged and violent manipulation.—*Med. News.* Dec 4, 1886.

JAMES E. PILCHER (U. S. Army).

**XI. An Obscure Case of Femoral Hernia.** By EDWARD BELLAMY, F.R.C.S., (London). S. H., a female, æt. 67, came under the care of the author on November 5, 1885, with what was diagnosed as a large left femoral hernia, evidently containing omentum. She had been ruptured since 1867, and the hernia had never entirely returned within the abdomen since its first appearance. She had never worn a truss, She was suffering from bronchitis, and a severe coughing fit, on the morning of her admission caused the rupture to increase very much in size and become intensely painful. The bowels were opened on November 3. Under ether taxis was tried, on two occasions but unsuccessfully, and under strict antiseptic precautions herniotomy was performed. A straight incision about four inches long was made and a loop of intestine seven inches long exposed, nearly black but still glistening, together with a mass of omentum as large as the author's fist, but showing no signs of strangulation, and to which evidently the coil of intestine was attached. After dividing what appeared to be the constriction, the author found he could not reduce the bowel, and under the impression that this was owing to the adherence of the mass of omentum, after clamping it beyond, the author excised the latter with scissors and tied each bleeding point separately. The liberated gut was then apparently easily returned into the abdominal cavity. On the 6th the patient was sick, but free from pain; passed a motion; pulse 120, tongue moist, wound dressed under spray, looked well. On the 9th, died suddenly at mid-day. At the post-mortem it was found that a finger could be passed into a cavity which surrounded the femoral opening, and on opening up the wound, a small piece of intestine, about the size of a pigeon's egg, was found to have descended through the canal, and to have become strangulated. This had been clearly brought down again by coughing. The large intes-

tine and stomach were empty and uninflamed. The liver was driven up. The lower part of the abdomen was occupied by a considerably distended coil of small intestine, exhibiting signs of early peritonitis. Below, this distended bowel led to the femoral ring, which it entered. Issuing from the wound was a perfectly collapsed piece of bowel, which occupied the deep part of the abdomen. The piece of bowel immediately below the opening was of a blackish color, and adherent by soft lymph to a thick mass of omentum which was firmly adherent to the left side of the inner opening of the femoral canal. Examination of the femoral canal revealed that the portion of bowel which lay external to the ring was continuous with a considerably larger portion lying in the cavity between the peritoneum on the one hand and the horizontal ramus of the pubic bone with the obturator internus on the other. Another cavity was also discovered between the peritoneum and the body of the os pubis, shut off from that above described by a complete membranous septum, having somewhat the feel of omentum. Below it was continuous with the inner wall of the femoral sheath. The author stated that from the condition of the parts, it was quite evident that the coils of intestine must, at each reduction on the patient's or medical attendant's part, have invariably been returned into one or other of the cavities above described. The secondary operation he would have performed would have been a laparotomy.—*Lancet*. Sept. 4, 1886.

11. PERCY DUNN (London).

**XII. Excision of Rectum.** SOCIN and KESER report three cases; two for cancer, the third for adenoma. In the first, a man of 57 years, the disease dated back five months. A relapse at the end of another five months necessitated coremoval of the tip of the coccyx. The second case was that of a woman of 62. The primary nodule was first noticed a year previously. A fistulous opening had developed into the vagina. In all three cases the patients made a good recovery from the operation.—*Jahrsbericht d. Spitals zu Basel*. für 1885.

## EXTREMITIES.

I. Osteoplastic Resection of the Foot after Wladimiroff-Mikulicz. ZESAS (Bern): K. ROSER (Marburg). In the ANNALS for May, 1886 (pp. 425-7), may be found a description of this operation, taken from G. Fischer. Another case is reported by Zesas, from Niehaus' clinic in Bern. The patient was a man of 50—the oldest as yet subjected to this operation—who, through an accident eleven months previously, had lost the soft parts of the left heel and a portion of the os calcis. Repeated attempts at covering the ulcerous defect by transplantation had failed. Even removal of the astragalus did not allow complete closure of the wound. Resection of the foot according to Mikulicz was then performed. After healing, the stump was found so mobile that a water-glass bandage had to be applied. Ten months later the undesired motility had vanished, though a foot-support and cane were still useful in walking. Zesas has collected nineteen cases, and mentions five other Russian ones never reported except incidentally by Sklifassowsky. So far as functional results go, he finds this method a decided improvement on that of either Syme or Pirogoff. In cases of tubercular bone disease, however, it gives no guarantee against relapse. He thinks the term "artificial pes equinus" as originally proposed by Wladimiroff in 1872 more suitable than the later term "osteoplastic foot-resection."—*Arch. f. klin. Chirg.* 1886. Bd 33. Hft. III.

Case II, of both Fischer and Zesas has since been more fully described by the operator, Dr. Roser, of Marburg. He feared neuro-paralytic trouble on removing 10 ctm. of the tibial nerve as done by Wladimiroff and Mikulicz. Consequently he proceeded as follows: The patient lying on his back, an incision is made along behind the internal malleolus to the median side of the scaphoid bone. The tibial nerve is then prepared out, divided opposite the malleolus, and its peripheral end freed from surrounding soft parts as far as Chopart's joint. Some filaments running heelward have to be severed. The incision is now deepened to the bone and the operation completed according to Wladimiroff, except that in dividing the soft parts the nerve loops must

be avoided. Finally, before sewing up the wound the peripheral nerve end is shortened some ctm. and united to the central nerve stump by two not perineurotic catgut sutures.

R's is the second (published) operation done according to W's original plan. It was for eight-year-old tubercular disease of the heel bones that had continually recurred after other methods of treatment.



FINAL RESULT IN ROSER'S CASE OF OSTEOPLASTIC RESECTION OF TARSUS.

Excellent result. A plaster bandage had to be worn for several months when a shoe with steel supports was substituted. Sensation was fully recovered in four months.—*Centbl. f. Chirg.* 1886. No. 36.

**II. On the Operative Treatment of Hallux Valgus.** By Dr. REIDEL (Aachen). When the covering bursa becomes inflamed, its simple removal does not suffice since the bursa develops anew. Hueter's method of removing the prominent head of the I-metatarsal

bone is considered (Hamilton, Rose, Sayre), to give good results, but possibly the cases have not been observed long enough. In flat-foot no inconvenience can follow even though an ankylosis forms, as in a case given by R. Otherwise, however, trouble may follow. In an 18-year-old-girl, Riedel exsected the head of the metatarsal on both sides. For a few months she could walk fairly well. Severe pain in the *planta pedis* then came on, and the heads of the remaining metatarsal bones became more and more prominent (on the sole). At the end of a year walking even with a stick was very tedious. The heads of the remaining eight metatarsi had to be removed. Fortunately this resulted in giving her neat little feet on which, the year since, she has been able to walk, dance, etc., free from pain.

Reverdin, in four cases, chiselled off the median exostosis and then removed a wedge of bone back of the metatarsal head. Riedel, in four cases, has had satisfactory results by a simpler plan. He removes the exostosis from the I-metatarsal, and the base of the I-phalanx. At the same time he smoothes the metacarpal head somewhat. The other toes remain somewhat abducted and the remainder of the first toe conforms slightly in this respect, but the good use of the foot is not interfered with.—*Centbl. f. Chirg.* 1886. No. 44.

WM. BROWNING (Brooklyn).

## GENITO-URINARY ORGANS.

**I. On Removal of Tumors of the Bladder, with Four Cases.** By J. GREIG SMITH, M. A., M. B. For the removal of tumors from the bladder in the female, incision of meatus and outer two-thirds of the urethra with dilatation of the remaining portion of the tube and vesical neck is recommended, in preference to dilatation of the whole canal.

The author claims for this method greater ease in carrying out the necessary manipulations, and less risk of subsequent incontinence. He recommends that the urethral wound should be sutured and no catheter left in the bladder.

For the removal of growths from the male bladder he considers



supra-pubic cystotomy the best proceeding. The operation is facilitated by dilatation both of the rectum and of the bladder. Garson's bag in the rectum is distended with water by means of a Higginson's syringe, the bladder is dilated after the incision through the abdominal wall has been made, whilst the surgeon's finger rests upon it, by the elevation of an irrigator attached by a long rubber tube to a soft catheter in the bladder. Distention is maintained by placing the irrigator on the same level as the bladder. In this manner it becomes unnecessary to ligature the penis. Accurate closure of the incision both in the bladder and abdominal wall is enjoined.—*Brit. Med. Jour.* June 19, 1886.

## II. The Surgical Treatment of Stone in the Bladder.

By WM. CADGE, F. R. C. S. In the course of three most able lectures the author formulated the following conclusions on the above subject:

1. In children, litholapaxy should be more adopted than has hitherto been the custom.

2. In male children, when the stone is at all large, the supra-pubic will probably prove safer than the perineal incision.

3. In female children, litholapaxy should be the rule for small stones and the high operation for all large ones.

4. In adult females, litholapaxy, or dilatation and extraction should be adopted for stones of moderate size, vaginal lithotomy for those somewhat larger, and the high operation for large ones.

5. In adult males, litholapaxy should be the rule for stones up to an ounce or an ounce and a half; above this, lateral or possibly supra-pubic lithotomy. Supra-pubic for all stones weighing over three ounces.

In the aged the same rules apply when the organs are healthy, but when the prostate is large and the bladder atonic, supra-pubic lithotomy until its success or failure is demonstrated.—*Brit. Med. Journ.*, June 19th, 26th, and July 3d., 1886.

## III. On the Nature of the So-Called "Hypertrophy of the Prostate." By Sir HENRY THOMPSON. This enlargement of

the prostate giving rise to more or less retention of urine is liable to come on at or after 54 years of age. As only a small minority are affected by it, it is not to be considered a necessary concomitant of old age. Indeed, if it does not manifest its presence before the age of 60, it but rarely gives rise to trouble afterwards.

The following table, which excludes malignant and inflammatory affections of the gland, is given :

PROSTATIC ENLARGEMENT OF ADVANCING YEARS.

A. Over development of tissues glandular and stromal, mostly in normal proportions throughout. This may be regarded as true hypertrophy.	A less common form of enlargement than others. The degree of enlargement less considerable than others.	On section the secretion abundant. Concretions numerous.
B. Increase of stromal tissue, but due chiefly to over-development, of the white fibres, not of the unstriated muscle. The original secreting structure may still exist or may have diminished in quantity. This form may be regarded as a "fibrous-hyperplasia," rather than as a general hypertrophy. If the pale muscular element is developed in like proportion, the term, fibro-muscular hyperplasia might be applied.	The most common form and attains the most considerable size.	On section the secretion appears according to the amount of gland tissue present; it is mostly smaller than in health. A few concretions.
C. Excess of glandular tissues over stromal. This may be classed as glandular hyperplasia.	Rare.	Secretion, abundant ; Concretions also.
D. Prearrangement of normal structures fibrous and glandular, in the form of tumour.	Common.	

*Brit. Med. Journ.*, June 19, 1886.

**IV. Electrolysis for the Treatment of Urethral Strictures.** By P. J. HAYES, F. R. C. S. Edin. (Dublin). In a small pamphlet, the author gives his experience of electrolysis, which appears satisfactory as far as it goes. Four cases are recorded, two of them being still under treatment, but in both these cases progress was

being made. One case is put down as a failure, *i. e.* at the first and only attempt, the stricture did not yield before the electrode. We would here remark that this seems to us an over-hasty decision, for the failure may have been due either to the size of the electrode or to the weak galvanic current, for no means of estimating the strength of current seems to have been used in this or, indeed, in any of the cases, or to the short duration of the séance which Mr. Hayes recommends to be of about five minutes duration.

The remaining case, being the first of the series, was so much benefited in eighteen days that whereas before the application of electrolysis, no instrument could be passed, at the end of that time No. 11. bougie, English, was passed. Whether the good effect in this case was due entirely, or in part, to electrolysis must be a matter of doubt, for this method was supplemented by the passage of bougies in quick succession.

The author, however, recognizes his mistake, and remarks further on: "Once electrolysis has been found suitable for overcoming the persistence of a stricture, other treatment becomes certainly superfluous and probably injurious."

F. S. EDWARDS (London).

**"Nephrolithotomy."** By CHARLES F. PICKERING. F. R. C. S. In this case the patient had suffered for some fifteen years from symptoms of renal calculus, though he was but 23 years of age. Lately the symptoms had become worse. He suffered from pain and tenderness in the region of the right kidney, the pain shooting down into the right testicle, and he had passed gravel with his water from time to time. Albumen was constantly present and a small amount of pus. The usual posterior incision was made, and a hard spot felt in the kidney, which was punctured with a needle, and the stone found at once. It was removed with a pair of dressing forceps. The stone was about the size of an ordinary plum-stone. The patient was practically well in eight days. *Brit. Med. Journ.*, 1886. Vol. II. p. 860.

**VI. "Nephrectomy by Abdominal Section."** By Mr. CULLINGWORTH. The size and character of the abdominal swelling

seemed to warrant the idea that the tumour was ovarian ; on incision it proved to be renal and a large amount of thick grumous material was evacuated. The left ovary being diseased was removed at the same time. The patient made a somewhat prolonged recovery owing to the fact that a lumbar abscess formed from which was discharged some fæces and the ligatured pedicle. Tumour sarcomatous in nature.—*Brit. Med. Jour.*, 1886. Vol. II. P. 823.

W. BRUCE CLARKE (London).

**VII. Case of Supra-Pubic Lithotomy.** SOCIN and KESER. A boy of 14 years, had suffered for six years from urinary troubles. In operating, the rectum was first tamponaded. The peritoneum remained intact. Permanent catheterization. The bladder and abdominal wound were sewed up except for the drainage-tube. The calculus weighed 67 gr. All drainage removed on fourth day. First passed water by the urethra on the eleventh day. Fistula closed by the sixteenth day. The boy was discharged at the end of three weeks. A week later readmitted, much of the urine again coming out through a small fistula at the lower end of the cicatrix. Local cauterization ; rest in bed. He was kept three and one-half weeks this time—the opening being then definitely closed.—*Jahrsbrcht. d. Spitals zu Basel f.* 1885.

**VIII. Fistula from Supra-Pubic Puncture of the Bladder.** Such a case is reported by Socin and Keser as having been admitted into their clinic. An abscess of the belly-wall had developed. This was incised, a catheter left in the urethra and the bladder regularly washed out. Cure. The case was complicated by an enlarged prostate and a large hydrocele.—*Jahrsbrcht. d. Spital zu Basel f.* 1885.

**IX. Rupture of the Bladder.** SOCIN and KESER. This was in man of twenty years. It was caused by a fall of 10 m. from a tree. Retention of urine. On catheterization bloody fluid was drawn off. Hiccough, spontaneous pains, and pressure sensitiveness in the lower abdominal region developed. Laparotomy the following day. A tear,

admitting tip of index finger, was found in the front bladder-wall. The rupture had remained extraperitoneal. The edges of the tear were stitched to the abdominal wall. Drainage of the space between bladder and symphysis. The bladder was washed out through the artificial fistula and the urethra. Drain-tube and catheter were removed on the ninth day; cure. The case was complicated by dislocation of the left elbow and fracture of the radius.—*Jahrsbricht.d. Spitals zu Basel f.* 1885.

## BONES, JOINTS, ORTHOPÆDIC.

I. Osteoplastic Operation for Hydrorrhachis (Spina Bifida). By Dr. J. DALLINGER (Budapest). The idea that complete treatment of this trouble would necessitate closure of the vertebral cleft had been previously suggested (König), and in one case (by Mayo Robson, of Leeds, 1883) an unsuccessful attempt had been made at closing such a fissure in a child of 6 days by means of periosteum from a rabbit.

D.'s case was that of a girl who at birth had a soft, nut-sized, red spot in the mid-lumbar region. This grew with the child. Extremities at first normal. Incontinence of urine and feces by the end of the first year. Walked for a while at two years of age. The sack had then been punctured and a small quantity of fluid withdrawn, but to no purpose. When five years old, D. found the tensely-filled tumour 36 cm. in circumference. The enlargement was non-pulsatile, but compressible without the production of nervous symptoms. Walking scarcely possible. Club-foot on both sides and slight knee-contracture from spastic condition of foot and knee flexors.

Since the sack had a broad base he did not try injections. Thirty grms. of clear fluid were drawn off without any reaction. A week later 150 grms. were removed, the sack relaxing. For some time after this, in the supine position, urine could be retained, and the spasm of lower extremity muscles ceased. In two days the sack was again full and the symptoms returned. After another week puncture repeated with like temporary improvement. An operation seemed warrantable. The sack was slit up. Its inner wall was continuous with the spinal

dura mater, the sack communicating by a 1 ctm. wide opening with the spinal canal. One  $\frac{3}{4}$  mm. thick and several thinner nerve filaments came out through the opening and passed to the sack-wall. During the whole operation fluid came from the opening. The whole sac was removed, the nerves cut off short, arteries tied and the dura stump firmly sewed up. The stump was then freed from the edges of the fissure, when it quickly sank back into the spinal canal. The intervertebral ligament between fifth lumbar vertebra and sacrum became visible, proving the sac to have been the distended lower end of the spinal dura. The sacral nerves passed down at the sides. Only the fifth lumbar vertebra was not united posteriorly. A thick layer of fat surrounding the neck of the sac was next removed. The tendon attachments of musculus multifidus and m. erector trunci were seen to surround the whole opening. A long, oval incision about 3 ctm. to each side was made, and the musculature divided down to the bone. The rudiments of the bony arch were partly pried, partly broken over until they met in the middle line, where they were sewed together. The severed muscle and tendon masses, and finally the skin, were also brought together. The cure was only interrupted by gangrene of a small portion of the thin skin. It was noticed during the operation that the instant the sac was emptied, the prolapsed rectum was retracted. A day later the urine could be retained for a short time, and in a few days the bowel movements were anticipated by the child. She got up at the end of a month and since then runs around lively. From 100 to 150 grms. urine can be retained, though at night the bed is wet. Clothing still occasionally soiled. The peculiarly favorable effect noticed each time on emptying the sack, he presumes, was owing to a relaxation of nerves which had been pulled or bent.—*Wien. Med. Woch.*, 1886, No. 46.

W. BROWNING (Brooklyn).

**II. Dislocation of the Hip.** By Prof. HUMPHREY. In a lecture delivered in Cambridge and printed in the *Lancet* of November 26, Prof. Humphrey combats the view which has lately been propounded that the dislocations of the hip in which the head of the thigh



bone passes backwards, or backwards and upwards, take place when the limb is in a state of abduction. He gives the dissection of three cases in which the accident took place in the living body, and of two in which he produced the dislocation in the dead body in the adducted and inverted position; and it was evident in each that the head of the bone had passed through a rent in the back, or back and under, part of the capsule, into the position in which it had occupied, directly, or as a direct result of the force applied. The pubo-femoral ligament was entire, which would not have been the case had the limb been dislocated in the position of abduction. The head of the bone passes commonly in the space between the two obturators, not under the obturator externus, and those muscles with the gemelli and the quadratus femoris are more or less torn. In some instances the head of the bone passes through the capsule at a rather higher level under the obturator internus which is then torn through together with one or both of the gemelli. The round ligament is always either rent across or torn from the dimple on the thigh bone. The ilio-femoral ligament escapes in consequence, partly, of its great strength. He gives examples from his early experience of the difficulty sometimes experienced in the reduction of the dislocation. In one of these, attempts with pulleys and other means were made for more than four hours, thirty-six ounces of blood were taken from the arm, and twelve grains of tartar emetic were given without effect, the patient was returned to bed with the dislocation unreduced, abscesses followed and he died. This was before anæsthetics were dreamed of. He contrasts with this, and gives the rationale of the modern method of reduction by manipulation under anæsthetics, and mentions the liability to redislocation during examination of the limb made to ascertain whether reduction has been effected, especially in cases in which the dislocation has for some time remained unreduced.

**III. Compound Separation of the Lower Epiphysis of the Tibia with or without Fracture of the Fibula.** By HENRY E. CLARK (Glasgow). The author describes two cases of this form of injury which had come under his notice. Case I. John

McGee, æt. 13, was admitted with what at first was supposed to be a compound dislocation of the left ankle.

While playing in an iron store a large sheet of iron fell forwards and struck him on the inner side of the left leg. On examination there was found to be a wound about two inches in diameter, much lacerated, and through which protruded the end of the shaft of the tibia. The end of the bone was irregular, but showed no appearance of fracture. It was rounded, and had the character of a diaphysis from which the epiphysis had been separated. The periosteum had been stripped off the bone for about two inches from the end on the inner surface, but somewhat less on the outer. The denuded bone was pale, but showed numerous pink spots dotted over its surface. The ankle-joint was uninjured, as also were the tibial arteries and nerves. The fibula was fractured about two inches above the tip of the external malleolus. In consideration of the age of the patient and the integrity of the ankle-joint, as well as the healthy appearance of the bone it was decided to try and save the limb, but it was found necessary to resect about three-quarters of an inch of the exposed diaphysis before it was found possible to reduce the deformity. The wound was well washed out with 1:20 aqueous solution of carbolic acid and dressed antiseptically. Suppuration occurred, and the wound healed by granulation, no necrosis of the bone taking place. On the last occasion upon which the patient was seen, the opportunity was taken of examining and measuring the leg, when it was found that the right tibia measured 30.5 cm. and the left 28.5, showing a shortening of 2 cm., about the amount resected in reducing the displacement immediately after the injury. It would appear, therefore, that there had been no arrest of the growth of the limb during the year and ten months since the accident, and this was the more evident as the lad had himself grown considerably in height in the interval. The movements of the ankle joints were perfect, and patient could bear his full weight upon it.

CASE II.—J. W., æt. 13, was admitted with what was believed to be a compound dislocation of the left ankle. On examination, however, the ankle joint was found to be intact, and that the lesion was in truth a compound separation of the lower epiphysis of the tibia. The dia-

physial end had been forced through the skin, making a wound on the inner side of the leg, just above the ankle, about two inches in length by one and a half in width. The periosteum was stripped off the diaphysis for about an inch, and was so lacerated that it was impossible to get it to cover the bone. Where uncovered the bone was pale, but marked by bright red spots at the openings of the vascular channels. The fibula was not broken, nor was there any separation of its lower epiphysis. The wound was washed out with solution of corrosive sublimate and dressed with carbolic gauze and a wood-wool pad, side splints being applied. At the first dressing, six days afterwards, there was no suppuration. At the next dressing, 24 days afterwards, there was a little suppuration, but the wound was quite superficial. At the end of five weeks from the date of admission the patient was discharged with an excellent limb. The movements of the ankle joint were perfect, and there was no measurable shortening. The author appends to his paper a list of those cases which have been recorded which correspond to his own.—*Glasgow Med. Jour.*, Nov. 18, 1886.

H. PERCY DUNN (London).

#### GYNÆCOLOGICAL.

1. **The General Principles Involved in the Removal of the Uterine Appendages.** Mr. LAWSON TAIT. This paper was in the main an answer to Sir Spencer Wells in the *International Journal of the Medical Sciences*. With most of it L. Tait entirely agreed.

As to the number of cases in which such an operation should be performed at present till more was known of the subject, no definite statements could be made. With regard to the terms spaying and such like which had been applied to such an operation, there was the greatest objection to their use, for they were most offensive and equally misleading. Such operations must be classed according to the pathological condition that preceded their performance. It was obviously unfair to class removal of the uterine appendages for bleeding myoma with the same operation where it was performed for suppuration of the tubes. In these two cases the cause was different, the diffi-

culties of the operation were very different, and the percentage of deaths differed widely as well. He agreed with Sir Spencer Wells that this operation was admissible in certain cases of deformity of the pelvis and in ovarian dysmenorrhœa. He was equally in accord with Wells that it should not be done, as a rule, in cases of madness or so-called menstrual epilepsy. Nor should it be performed on an insane person unless its nature were fully explained to a sane relative.

He pointed out, in conclusion, that whilst such operations should always be preceded by a consultation, that a consultation became a mere farce if one or more of the consultants had made up his mind before hand that all such operations were inadmissible.—*Brit. Med. Jour.*, 1886, Vol. ii, p. 852.

### SYPHILIS.

**I. Etiology of Gonorrhœal Arthritis.** SMIRNOFF. This Russian observer, by examination of the fluid drawn off from a knee-joint of a patient suffering from gonorrhœal (or as it is better termed urethral) arthritis, was able to confirm the results of a few previous writers—that gonococci are present freely in the affected joints. It is interesting to note that lately, Dr. Mantle, of Newcastle, has brought forward considerable evidence in favor of regarding acute rheumatism as depending on a microbic origin.

There are certain differences between urethral and rheumatic joint affections—in particular, the obstinate resistance to treatment which the former present as a rule, but their points of resemblance and the fact that a large number of the urethral cases have previously suffered from rheumatism or are of the “rheumatic type,” have been pointed out by many observers.

It may be taken as proved (see the article on Bacteriology in the ANNALS OF SURGERY for August, 1886, by Dr. Van Arsdale) that gonorrhœa has for its cause the gonococcus as demonstrated by Neisser, Bumm and others. It has also been noticed that occasionally a patient who had recovered for some time from an attack of gonorrhœa, was liable to fresh outbreaks of urethritis (without fresh exposure) following some abuse of stimulants, etc. We must suspect in these

cases that the gonococci have remained dormant in the urethra for a considerable time, and if this be the fact, it may serve to elucidate those cases in which urethral arthritis follows catheterism and in which there is no evidence of recent gonorrhœa. At the same time the nerve-reflex theory advanced by Dr. Ord and others cannot be entirely ignored. Obstinate sciatica and lumbar neuralgia are occasional sequences of gonorrhœa, and these symptoms would certainly fit in well with the reflex theory. One further difficulty remains in the asserted connection between a tendency to gout and the liability to arthritis after gonorrhœa. Although many obscure points as to urethral arthritis must remain as yet undecided, yet the evidence of its microbic nature, as shown in isolated cases by Smirnoff, Petrone, Hemmerer and Afanasieff is becoming strong and may ultimately assist us in the treatment of this most troublesome disease.—*Vratch*—see *Lancet* of August 28, 1886.

**II. The Treatment of Syphilis by Subcutaneous Injections of Mercury.** By J. ASHLEY BLOXAM. Mr. Bloxam states that during the last two years upwards of fifteen hundred cases have been healed at the Lock Hospital by the intra-muscular injection of corrosive sublimate. One-third of a grain of the drug in aqueous solution is injected into the gluteus maximus (or sometimes the trapezius) and the proceeding is repeated once a week, in all from eight to twelve grains of the perchloride being used for each case. It is obvious that if this small quantity suffices for the treatment of secondary syphilis protracted during some twelve months, the amount usually given by other methods is considerably greater than is required, granting that the drug is twice as potent when given hypodermically as in the same dose by the mouth. Mr. Bloxam generally orders quinine whilst the patient is undergoing the injection treatment—which he asserts never produces pytalism or gastric disturbance.

We must own to a belief that this method of healing syphilis will not come into general use, especially since various previous observers having given it a careful trial have subsequently abandoned it.—*Lancet*, August 21, 1886.

J. HUTCHINSON, JR. (London).

**III. Hereditary Syphilis in a Man *Æt.* 30.** A. FOURNIER (Paris). Prof. A. Fournier describes the case of a man *æt.* 30, with undoubted manifestations of hereditary syphilis and believes that there has been no authenticated case occurring at a later age. The patient presented himself with patches of ulceration on the penis. They involved the fold between the glans and prepuce, also the meatus. They were three or four millimetres in width, with a yellow putrid cavity, surrounded by a dark areola and some induration. They had all the appearance of broken down gummata. The glands in the groin were not affected.

He at once declared the case to be one of tertiary syphilis much to the patient's surprise who declared this to be his first venereal mishap, and it was only on cross-examination that he obtained the following conclusive facts: (1) The patient had been slightly deaf of both ears since early infancy, but had never had any discharge from them. (2). At 14 he had suffered from double keratitis with total temporary blindness. There were no appreciable traces left to show this. (3). In childhood there had been some serious lesion of one knee, leaving deformity and much scarring. The patient had suspected syphilis in his parents. The mother's medical attendant, who was consulted, stated that she had been infected with syphilis by her husband during her pregnancy, that the patient himself was treated for syphilis in his early infancy and had even communicated it to his wet-nurse.—*Gaz. hebdomadaire de Med. et de Chir.* Oct. 29.

L. MARK (London).



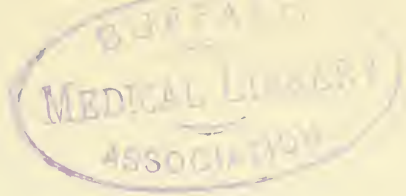
## REVIEWS OF BOOKS

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ON SOME FORMS OF PARALYSIS FROM PERIPHERAL NEURITIS,—By  
THOMAS BUZZARD, M.D., London,

The basis of this little book consists of the lectures which were delivered by the author in 1885 at the Harveian Society in London, and which afterwards appeared in the pages of the *Lancet*. The subject is one, of course, which is almost purely medical, and as such scarcely comes within the domain of surgical literature. Despite, however, this fact, many details will be found in the pages devoted to the discussion of the influence of gout, alcohol and diphtheria in the production of peripheral neuritis, which will be interesting to the surgeon. The protean forms in which gout presents itself makes the treatment of the disease a surgical, as well as a medical matter, and Dr. Buzzard, referring to the question of the possibility of gout causing neuritis, to which reference was made by Mr. Hutchinson in his Bowman lecture, states, "I have very little doubt that neuritis is not seldom due to the presence of gout; the difficulty of proof is, of course, extremely great. I cannot lay claim to adduce anything which is absolutely positive upon this point, but some clinical observations, and especially certain electrical examinations which I have made appear to lend considerable strength to this view." The book abounds with the notes of interesting cases which have come under the observation of the author, and some concise remarks upon the diagnosis, prognosis and treatment of the various forms of this disease, complete a useful and instructive monograph upon a subject which, to say the least is an attractive one, notwithstanding, the obscurity in which some of its points are involved.

H. PERCY DUNN.



# ON THE PATHOLOGY OF TRANSVERSE FRACTURES OF THE PATELLA AND THE OLECRANON.

SHOWING THE CHIEF CAUSE OF NON-OSSEOUS UNION IN THESE FRACTURES AND HOW TO OBVIATE IT.

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MUCH attention has been paid of late to the treatment of transverse fractures of the patella, and advance has in some quarters been made in this direction. This change in treatment has, however, neither been preceded by researches on the pathology of transverse patellar fractures, nor has it been founded on results such as could have been obtained from such an investigation. Great diversity of opinion consequently exists as to treatment, and the majority of surgeons, entertaining the current views as to the causes of non-osseous union, have adhered to the older methods of treatment. Not being satisfied with the views generally entertained by way of explanation of the causes of non-osseous union of transverse patellar fractures, the writer has since 1879 made observations on the subject. The outcome of these was given in a clinical lecture to the students of the Royal Infirmary School in the spring of 1883 and was subsequently published in the *Lancet* (17th November, 1883). The observations which have been made since that time have fully borne out the conclusions then formulated.

*Anatomical Aspects of the Præ-Patellar Aponeurosis.*—The tendon of the quadriceps is for the most part inserted into the groove on the upper portion of the patella, the strong aponeurosis being attached to its sides, while the ligamentum patellæ

arises chiefly from its lower border. Over the centre of the anterior surface of the patella it is generally supposed that the aponeurotic fibres are either wanting or are so sparsely distributed as to be scarcely worthy of consideration. This the writer considers to be a mistake, especially when applied to the period of adolescence and full vigorous adult life, as under these circumstances there is a distinct firm band of ligamentous structure, passing over the front of the patella, continuous with the tendon above and the ligament below.

In order to expose the aponeurotic structures in front of the patella so as to enable one to form an estimate of their arrangement and dimensions, the following method was adopted: A longitudinal section was made through the centre of the quadriceps extensor tendon, the patella and the ligamentum patellæ. One-half of the structures so divided was taken, and the portion of the patella which it contained was



FIG. I. LONGITUDINAL SECTION THROUGH CENTRE OF ARTIFICIALLY FRACTURED PATELLA (representing the upper portion of an artificially produced transverse fracture of the patella, the lower fragment of the patella having been torn from its præ-patellar attachments in order to show the latter. Drawn from an actual specimen taken from a subject (male) 15 years of age).

sectioned transversely at its centre, beginning at its articular surface and passing almost completely through, leaving only a portion anteriorly slim enough to permit of fracture. After breaking this portion the lower half of the sectioned patella was torn from its ligamentous and aponeurotic connections, leaving them exposed. (See Fig. I).

Ten patellæ removed from as many different subjects were thus submitted to examination. They were all obtained in a fresh state and not subsequent to an ordinary dissecting-room course, as after that the parts are generally dried and shrunken. Several of them were obtained from young subjects, one an

infant, one a child of two years, one fourteen, one seventeen and one twenty years. There were four adult males of thirty to forty-five years of age, and two were from subjects above sixty years.

In young children the ligamentous structures running in front of the patella were represented by a very thin film, in many places scarcely distinguishable from the cartilage. In advanced life the præ-patellar tendinous structures were attenuated especially over the centre of the patella. In the six instances ranging from fourteen to forty-five years of age, the aponeurotic structures ran in a distinct band over the front of the patella, continuously from the tendon of the quadriceps to the ligamentum patellæ. The antero-posterior diameter of this layer ranged from one to three millimetres (one-thirty-second to a sixteenth of an inch). The bulk of these fibres were longitudinal, many of them seemingly continuous from the tendon to the ligament. A few were oblique. The examination of these structures during life in cases of transverse fractures of the patella recently produced, coincided with these anatomical observations. In considering these facts in relation to transverse fractures of the patella, it should be remembered that the period in which this fracture is most prone to occur coincides with that in which aponeurotic structures are most developed in front of the patella.

There have been three causes assigned for the want of osseous union after transverse fractures of the patella. First, a supposed deficiency in the patellar blood supply, causing a low vitality of the part and thereby preventing an outpouring of sufficient ossific deposit to unite the fragments together. Second, the separation of the fragments, by the powerful retraction of the quadriceps extensor muscle carrying the proximal portion of the patella upwards away from the lower; and third, the distention of the knee-joint by blood and serum, thus preventing the approximation of the fragments.

Regarding the first of these the facts are entirely against the assumption that there is a deficient supply of blood to the patella. Injected specimens of the vessels going to and from that bone show that the blood supply from its numerous ves-

sels is abundant, and the parenchymatous hæmorrhage which ensues from the cancellated tissue in transverse patellar fractures is a proof not only of its large supply but also of its thorough distribution. The fact that osseous union is so constantly obtained in longitudinal fractures of the patella, and that ossific deposition is so abundant in certain diseased states of that bone, are of themselves evidences that the assertion is untenable.

It has been said that pressure of a bandage during treatment of transverse patellar fractures might arrest the flow of blood into the proximal fragment and osseous union would thereby be prevented. Were this correct, it would equally prevent the formation of connective tissue between the fragments; but there is no lack of a firm and substantial growth of connective tissue there. It would equally apply to the treatment of longitudinal fractures, whereas in the latter osseous union is the rule.

The contraction of the quadriceps extensor muscle, which separates the fragments by pulling up the proximal one, might act as a cause of non-union, provided no attempts were made to bring the fractured portions together. The contractions which at first ensue soon subside, and the muscle remains in a state of rest. The resistance then offered by it is so slight that it is easily overcome, and could not be a cause of non-union, provided ordinary care were adopted. In cases of transverse fractures of the patella coming under the writer's notice in which the parts were exposed shortly after the accident, the upper fragment could with very slight downward pressure, such as that exerted by the fingers, be brought into contact with the lower one.

The effusion of blood and serum into the knee-joint, causing separation of the fragments by distention of the joint, frequently does obtain, but it is seldom sufficient of itself to prevent osseous union because of the rapidity of its resorption. A small quantity of blood clot, on the floor and roof of the fractured edges might even be of service in preventing the wandering into the joint of osteoblasts and in forming a medium in which they might congregate and unite together into osseous plates. The presence of coagulated blood between the

fractured surfaces of bones is constant throughout the body, and is not productive of non-osseous union. Therefore of the three causes formerly assigned for non-osseous union of transverse fracture of the patella, the first is absolutely fallacious, the second is practically inoperative, when the patient is subjected to any of the ordinary methods of placing the fragments in contact; and the third, while it occasionally obtains, does not do so in the majority of cases to an extent sufficient to prevent osseous union. The fact remains, that osseous union of a transverse fracture of the patella treated by the ordinary methods, is rarely attained. It is then evident that in such cases there must be another cause to account for the want of bony union, and that must be one which does not apply to longitudinal fractures of the patella.

In seeking for such an explanation, let the reader's attention

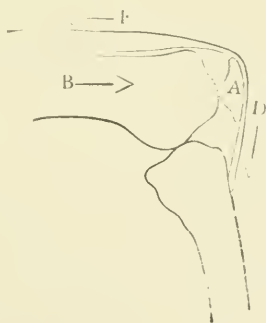


FIG. 2. MECHANISM OF TRANSVERSE PATELLAR FRACTURE. (Diagrammatic).

be directed to the manner in which transverse fractures of the patella are occasioned. It is understood that the majority of transverse patellar fractures are due to violent muscular action, most frequently caused by sudden efforts to maintain the equilibrium, while one is in the act of falling, the knee being slightly bent. The sudden development of the full retractile force of the powerful quadriceps causes the patella to be jerked upwards, relatively to the femur, beyond the position where it usually lies supported laterally by the femoral patellar surface. The patella being held below by the powerful ligamentum



patellæ rests on the apex of its posterior vertical ridge, which thus becomes the point upon which is developed the greatest energy of the two opposing forces; that of the contractile power of the quadriceps extensor on the one side and the weight of the body on the other. Mechanically it may be stated thus:

The body A. is in the position of a lever of the first order; the muscular force exerted in the direction indicated by the arrow E. being considered as the power, the weight of the body transmitted through the bone B. as the fulcrum, and the resistance to rupture of the band D. as the load or weight. The strength of the lever not being sufficient to resist the strain, the former gives way. So transverse patellar fracture results.

The fibrous and aponeurotic structures lying in front of the patella are more elastic than the bone. When the bone snaps and retracts, the fibrous and aponeurotic tissues over it still holding, bridge the interspace between the fragments. So that they are neither ruptured at the same moment nor at the same level as the bone. If the contraction continues, the aponeurotic and fibrous tissues become overstretched and lose their resilience. When the force is sufficiently great, this bridge gives way, becomes torn into longitudinal strips, and these inelastic shreds rupturing at variable distances are forced into the hiatus between the fractured bone. The majority of these shreds remain attached to the upper patellar fragment, and their extremities would lie loosely over the fractured surfaces if it were not for the fact that, at the moment the transverse fracture ensues, the upper fragment, owing to the manner of insertion of the quadriceps extensor tendon, becomes tilted, so as to present the plane of its fractured surface anteriorly; and as it is drawn upwards, those shreds of præpatellar tissue are pressed firmly over its fractured edge by the flexing of the joint, and the action of the atmospheric pressure forcing the soft tissues inwards to fill up the hiatus. Those shreds thus become fixed to the osseous spiculæ, all of them adhering mechanically in intimate contact with the bone. It thus happens that the serrations on the edge of the broken surface of the upper fragment act like so many pins to which the apon-

eurotic structures become attached and often transfixed. Nor is it only the aponeurotic tissues which are thus driven in between the fragments, but the floor of the patellar bursa is generally ruptured, and portions of it either hang like curtains over the fractured extremities or are firmly fixed to them, being superimposed on the aponeurotic tissue. The tissues which intervene between the fragments and the particular form and arrangement which they assume relatively to the bone, vary according to the case. With those structures intervening between the fragments, osseous union is impossible and even fibrous union will be modified relatively to their extent and arrangement.

*Transverse Patellar Fracture without Rupture of the Præpatellar Structures.* Occasionally transverse fractures of the patella occur without rupture of the ligamentous and fibrous tissues in front. A young medical man engaged in a football match, while struggling for the ball, was thrown along with several others. He experienced a sharp pain at the knee, but with the exception of aggravating this pain he could walk without much difficulty, though occasionally there was a feeling of crepitation. On examining the patella, he found that there was no hiatus though osseous crepitation was easily detected on lateral movement, the aponeurotic tissues remaining intact. This fact was verified by several surgeons who examined it. The knee-joint was kept stiff, a bandage being applied over the patella. This arrangement was retained for three weeks, the doctor meanwhile walking about. Firm osseous union took place. Some years later the young surgeon showed his limb to the writer who found only a transverse ridge on the patella to mark the seat of the former fracture. The movements of the limb were perfect, and he still engaged in athletic pursuits including football. In this instance the fragments had no intervening tissue between them, and they had the additional advantage of being retained in position by the aponeurotic tissues binding them together, hence the firm osseous union.

It is highly probable that those specimens which are occasionally seen of osseous union after transverse fractures of the

patella have been obtained from patellæ which were fractured without accompanying rupture of the præ-patellar ligamentous structures. It is also stated that fractures of the patella resulting from direct violence are much more likely to result in osseous union. This may arise from the fact that there is here no intervening soft tissue.

In the cases of transverse fracture of the patella that have come under the writer's care, the præ-patellar structures have been found intervening between the fragments and attached to them in the manner described. In order that the reader may form an independent opinion, the appearances found upon examining these cases are here presented.

As the first two cases have already been published in the *Lancet* for November 17, 1883, they are given here only in abstract.

CASE I. *Simple Transverse Fracture of the Patella, Operated on Twenty-four Hours after the Injury.* J. H., æt. 24 years, received a series of injuries in April, 1882, one among them being a transverse fracture of the patella, the lower fragment having a portion of its outer margin broken longitudinally.

An incision in line with the length of the limb was made over the joint, fully exposing the fractured patella. In the extended position of the limb, the upper fragment lay within one inch of the lower, and could be brought close to the latter with slight effort; even placing the hand on the quadriceps extensor and pressing lightly downwards as would be done by a bandage applied externally was sufficient for the purpose. A small quantity of blood clot was in the patellar bursa, the floor of which had given way and lay partly over the surface of the upper fragment and partly over the lower. When the fractured pieces were brought into proximity, the loose floor of the bursa intervened. On elevating the floor of the bursa, which was but slightly attached to the fractured surfaces, it was seen that the aponeurosis from the front of the patella lay over the fractured surface of the proximal fragment to which it was firmly attached, several of the osseous spiculæ having penetrated it. It seemed tightly stretched over the anterior margin, while its distal extremity was ragged and fringed. The lower fragment was not quite so much covered by the aponeurotic structures except laterally, where the ruptured fibrous expansions from the sides of the patella bulged towards the centre of the joint, so as to overlap the

lateral extremities. The structures found intervening between the fragments, therefore, were first the floor of the bursa patellæ; second the præ-patellar aponeurosis, and third the fibrous expansions attached to either side of the patella.

CASE II. *Simple Transverse Fracture of Patella Exposed Twelve Hours after Injury.* R. A., æt. 40 years, had sustained a transverse patellar fracture while endeavouring to prevent himself from falling. A longitudinal incision exposed the parts. The bursal floor was ruptured, the bursa patellæ was partly distended with blood, but the ruptured margins of the floor, owing to the blood behind, bulged forwards away from the fragments. The præ-patellar aponeurotic structures lay in a single piece over the fractured surface of the proximal fragment, the outer two-thirds of which were completely covered, while the inner third had its posterior margin free. This piece was firmly attached to the irregularities of the fractured bone, and had to be scraped up with a periosteal elevator before it was detached. The lower fragment was left exposed, there being no præ-patellar structures covering its fractured surface. It had, like the former case, been divided longitudinally towards its outer third. There was a small quantity of blood clot in the joint. After these structures were elevated, the two fragments lay within half an inch of each other, when the limb was straight, and they could easily be placed in intimate contact. In this case then the præ-patellar aponeurotic structures lay over the proximal fragment to which they were firmly attached, otherwise no other structures intervened.

CASE III. *Simple Transverse Patellar Fracture—Exposed 36 Hours After the Accident.* M. P., æt. 30, was admitted into Ward 29 on May 14, 1885, suffering from a transverse fracture of the patella sustained by muscular effort, while attempting to prevent himself from falling. When he came under observation, 36 hours after the accident, there was not much swelling about the joint. The fragments were completely separated, and lay, when the leg was extended, about half an inch apart. When the fragments were approximated, which could easily be done, and an attempt was made to elicit friction, it resulted in imparting to the fingers a distinct soft sensation, there being no crepitation, even on trying to rub the posterior edge of the fractured surfaces together. Thirty-six hours after the accident, a longitudinal incision was made over the centre of the patella, exposing the fragments. There was only a small quantity of blood clot within the knee-joint, which when removed, revealed the fact that both proximal and distal fragments had their fractured surfaces covered over their whole extent from before backwards with soft tissues. Portions

of the floor of the bursa, which had been ruptured transversely, lay semi-detached between the fragments. Both the upper and lower fragments had their fractured surfaces covered with the aponeurotic tissues, and also with the shreds of the bursal floor, so that there was no part of their fractured surface bare. The soft structures were found to be firmly caught on the projecting bony prominences. Those structures were elevated and the bone was drilled and brought together with silver wire in the ordinary way.

Five weeks afterwards the wound was looked at for the first time and found healed. The silver wire was likewise withdrawn by being wound over dressing forceps. Seven weeks after he was allowed to rise and go about. The movements of the knee were very free at the end of the eighth week.

CASE IV. *Simple Transverse Fracture of Patella—Exposed 14 Hours After the Injury.* W. M., æt. 29, was admitted into Ward 29 in December, 1885, suffering from a transverse fracture of the right patella, which he had received while trying to prevent himself from falling, after slipping on the street. There was very little swelling about the joint. When the limb was extended, the upper portion of the patella lay about two inches apart from the lower, but it could be approximated with ease. A little crepitation was detected, when the posterior edges were rubbed together, though none could be elicited when the patellar surfaces were placed flat against one another. On making a longitudinal incision over the patellar fragments, there was only a very small amount of blood clot seen between the fractured surfaces. After clearing it away, the following condition of the parts was exposed. On the fractured surface of the upper fragment, there was a dense layer of fibrous and aponeurotic tissue, which covered its whole upper aspect, while its inner two-thirds were covered by the same material for about half their diameter. The only portion of the lower fragment which was at first visible was its posterior border, the anterior two-thirds being completely clothed by the fibrous and aponeurotic structures, which hung over the top and covered the sides. When the patellar fragments were brought together and rubbed, these portions of tissue imparted a soft feeling, so much so, that they might be mistaken for blood clot intervening between the fragments. Two long portions of aponeurotic tissue still connected the upper with the lower fragment. These lay doubled in and folded between the fragments. When extended, they measured three and three-quarter inches in length, and were about one-sixteenth of an inch in breadth. They formed part of the aponeurotic bridge, greatly overstretched, but



which had not given away. When the lower borders of the patella were brought together and alone apposed, osseous crepitation could be developed. When the limb was fully extended, the patellar surfaces lay about a couple of inches apart, and could be brought together with very slight traction on the upper fragment. An aperture was formed on both sides of the joint for drainage, and the patellar fragments were united with stout wire, the external portion of the wound being sutured with gut.

It may be noted that the patient was able at the end of the sixth week, when the wires were removed, to bend his knee slightly; and at the end of the eighth week, he walked very well; complete flexion being ultimately restored. The wound had only been dressed once, just after the completion of the operation.

CASE V. *Simple Transverse Fracture of Patella—Exposed 24 Hours After.* J. H., æt. 40, was admitted into Ward 29, April, 1885, suffering from a transverse fracture of the patella, which he had received about 24 hours previously while attempting to prevent himself falling. When the limb was in the extended position, a gap of about two and a half inches existed between the fragments, but these were easily brought close together by digital pressure. On attempting to elicit crepitation, by rubbing the two fractured surfaces, it was found that this was impossible, as soft tissues existed between them, except at their posterior aspect, where on tilting the fragments, so as to bring their posterior edges together, osseous crepitation could be detected. After exposing the patella by a longitudinal incision in the middle line, and after clearing away the blood clot, it was found that a mass of tissue existed between the broken bones. At some points this was fixed to the proximal surface of the fracture by osseous irregularities, which had transfixed the soft parts in such a manner as to hold the soft parts firmly in their abnormal position, almost as if they had been tacked to the bone. The soft tissues which intervened between the fragments consisted of the lacerated floor of the bursa, the folds of which dipped down loosely between the fragments. and when the broken surfaces were approximated, they intervened between them. Then the aponeurosis and periosteal covering were firmly stretched over the proximal fragment and fixed to the osseous projections just mentioned. This portion moved up and down along with the movements of the patella, and it covered the whole diameter of the proximal fractured surface with the exception of the posterior margin. The distal extremity of the patella was broken into three parts. The transverse fractured extremities were likewise covered with portions of the



aponeurosis and periosteum, so as to make it impossible for union to take place, on account of the intervening tissue.

All these structures were elevated, sutures were introduced uniting the fragments, and the wound was dressed. Six weeks subsequently the wires were withdrawn, and eight weeks after the limb was still stiff. At the end of the third month this stiffness was still present to some extent; he could not bend his knee further than a right angle.

CASE VI. *Simple Transverse Fracture of the Patella—Exposed 48 Hours After the Accident.* R. S., æt. 41, came under observation in May, 1885, suffering from a transverse fracture of the patella, received while stepping out of a vehicle in motion. The fragments were about an inch apart, as the limb lay extended. There was no crepitation detected on rubbing their surfaces together. Forty-eight hours after the accident, an excision, which exposed the parts, showed a small quantity of blood clot in the bursa, which also dipped down between the fragments.\* The bursal floor was ruptured, transverse portions of it hung over the fragments and intervened between them when they were approximated. The aponeurotic tissue was tightly stretched over the proximal portion of the patella, and was firmly attached to its fractured surface by the osseous irregularities of the latter. The greater part of the proximal patellar surface was covered, only a slight margin of the articular cartilage being exposed. The distal fragment was alone covered by bursa.

The bone was wired. Three weeks after the wound was examined for the first time, and was found healed. At the end of six weeks the wire was withdrawn. Eight weeks after the patient walked freely about, and could flex his knee to a right angle.

CASE VII. *Simple Transverse Fracture of the Patella—Exposed 24 Hours after the Injury.* A. McD., æt. 53, was admitted into Ward 22 February, 1886, with a transverse fracture of the patella, sustained while he attempted to get off a car in motion. On examining the patient, there was found to be a transverse fracture of the patella with complete separation of the fragments, the distance between them being two inches when the limb was extended. On exposing the fragments by a longitudinal incision over the centre of the knee joint, a mass of blood clot was seen to fill the patellar bursa and to dip down between the fragments into the joint, through the ruptured floor of the bursa. When the blood clot was cleared away the fractured surface of the upper fragment for about one-half of its antero-posterior diameter was found to be covered by aponeurotic structures and commingling with them were shreds of the floor of the ruptured bursa.

These portions of tissue were disposed in a series of folds and were not so closely attached to the fractured surfaces as usual, as with the exception of one or two portions, they could be lifted without the application of the elevator. When these portions of tissue were raised and extended, they measured from half an inch to an inch and one-eighth in length. The two posterior thirds of the lower fragment were covered by a band of aponeurotic tissue, measuring a quarter of an inch in breadth and running transversely across the joint, from the inner to the outer side. This band was somewhat broken up into transverse strips, which were firmly fixed to the osseous spiculæ on the fractured surface. When this band was relieved from the osseous spiculæ which transfixed it, it slid into the knee joint under the lower fragment. The posterior edge of this fragment then became tilted anteriorly, so that while it was easy to approximate the posterior edges of the fractured surfaces, it was very difficult to bring the anterior ones together, owing to the resilient resistance which this band offered. After removal of this band the fractured surfaces were easily placed in apposition.

The usual treatment was adopted.

This patient never had a bad symptom: the wound healed by first intention. The wire was withdrawn at the end of the sixth week. At the end of three months the movements were quite restored, firm osseous union having been obtained.

*CASE VIII. Simple Transverse Fracture of Patella—Exposed 14 Days After the Accident.*

S. Q., æt. 35, was admitted into Ward 22, in April 1886, suffering from a transverse fracture of the patella, which she received 14 days previously, by muscular violence, while attempting to prevent herself from falling down stairs. When the limb was extended, the upper part of the patella was about one inch apart from the lower. When the knee-joint was opened, the patella was found to have been fractured at the junction of its middle with its lower third. The interval between the fragments was filled with blood clot, and so also was the bursa patellæ, the anterior wall of which was intact and thickened with effusion, while the posterior wall was ruptured and formed the anterior layer of a flap of tissue which lay over and covered in completely the proximal patellar fragment, no part of its osseous wall being exposed. This flap of soft tissue effectually prevented crepitation, even when the posterior parts as thus exposed were approximated. On carefully separating the bursal floor from the underlying flap of soft tissues, it was seen that the next layer consisted of long shreds of ligamentous structures, which were firmly adherent to the spiculæ of the cancellated

tissue of the upper fragment. The majority of these shreds were quite as long as the breadth of the fractured surface, some ending at the posterior cartilage, others forming a slight fringe which projected into the joint. One shred, which measured from the anterior margin of the fracture was fully two inches in length, had its upper part fixed to the bone while its lower lay loosely in the joint. Several of these ligamentous shreds were curled up at their extremities and lay in the interstices of the bone. These had to be removed by means of the periosteal elevator, many of them having to be scraped out. After doing so, there was found to be a portion of osseous tissue adhering to the ligamentous structures and lying anteriorly and a little over the fractured surface of the upper fragment. This osseous tissue had been removed, along with the fibrous and ligamentous bands to which it still adhered, from the anterior aspect of the distal fragment; so that here the flaps over the front of the upper fragment, consisted of: First, the floor of the bursa patellæ; second, the fibrous and ligamentous structures covering the patella; third, a small portion of the osseous substance from the anterior surface of the lower fragment. The fractured surface of the lower fragment was comparatively free, except for bands of well formed fibrin. The synovial membrane of the joint was swollen and highly injected and projected slightly between the lower borders of the fragments.

The usual treatment of elevation of the interposed tissues and suturing was adopted. The wire was withdrawn six weeks after, when the dressings were removed for the first time. The patient walks freely about without any stiffness.

Since publishing the first paper on this subject there have been a number of cases published of transverse fractures of the patella, in which the aponeurotic tissue has been detected between the fragments in the manner described. Among these was one described by Dr. Fowler, of New York, in which he found the aponeurotic tissue dipping down between the fragments of a transverse fracture of the patella, in such a way as to prevent the possibility of union by bone. Dr. Hardy, of Manchester, has kindly informed me that he has found the aponeurotic tissue intervening between the fragments in three instances. "In one, a piece as thick as a penholder and two and a half inches long was turned over the upper fragment and lay in the joint. In another, a considerable quantity of fibrous

tissue was intimately adherent to the whole width of the broken surface and required to be carefully picked off. In a third, the upper fragment had, as it appeared, forced itself through a transverse cut, so that a string-like piece of fibrous tissue, connected at its two ends, lay underneath the patella in contact with its articular surface. Some small shreds were also closely applied to the broken surface. A specimen somewhat resembling the condition described as existing in Mr. Hardy's last case was presented by Mr. Maylard to the Pathological Society. It was taken from the subject. The patient was one of Dr. Cameron's who had not been operated on for transverse patellar fracture, but who had died from heart disease. There was a quantity of aponeurotic tissue intervening,



FIG. 3. TRANSVERSE FRACTURE OF PATELLA. (Diagrammatic) presentation. Patellar fractured surfaces seen from before with shreds of ruptured aponeurotic tissues overhanging them.

and one portion of it lay transversely stretching across the fractured surface. Besides the published cases spoken of the writer has been assured by several surgeons that they have met with similar arrangements of the præ-patellar tissues in transverse fractures of the patella.

Here are thirteen cases of transverse fractures of the patella, in which portions of soft tissue intervened between the fragments in such a manner as to render osseous union an impossibility. When it is remembered that eight of these cases which fell under personal observation, were consecutive, the probability is that in the majority of transverse patellar fract-

ures, the same causes are at work in preventing osseous union. It may also be gathered from a survey of these cases, that too much stress has hitherto been placed on the contractions of the quadriceps muscle, as well as on the presence of blood clot in the joint, as causes of non-osseous union. They exist as factors which require consideration, but they are of minor importance. The true cause of non-osseous union in transverse fractures of the patella lies in the fact of the interposition of the aponeurotic and bursal structures between the fragments. Transverse patellar fractures occasioned by muscular violence are especially prone to have these structures intervening. Patellar fractures occasioned by direct violence, which are often more or less stellate, seldom have complete rupture of the aponeurotic structures accompanying them, and consequently have better opportunities of becoming closely



FIG. 4. TRANSVERSE FRACTURE OF PATELLA; LONGITUDINAL SECTION (representing ruptured aponeurotic tissue, arranged as in No. 3, but the extremity of the tissue has been elevated from the bone).

united by fibrous union, or even by osseous union, without operative intervention. Fractures in which the lower fragment only is multiple from having been divided by contact with some external body met with in the fall subsequent to the occurrence of the transverse fracture from direct violence, ought not to be included under this group.

The following may be taken as a summary of the pathological conditions met with in transverse fracture of the patella.

The præ-patellar tissues, found to intervene between the fragments, consist of the floor of the patellar bursa and the aponeurotic and fibrous tissues.

The floor of the patellar bursa intervenes in a variety of ways, occasionally it represents transverse bands and flaps, at others, a series of shreds, all of these hanging between the fragments of bone or folded more or less loosely over them.

Often the bursal floor is much congested and thickened from irritation and possibly also by imbibition.

The aponeurotic tissues are those which are most intimately connected with the fractured surfaces and especially to that of the proximal fragment.

They assume various forms :

1. That of a flap, tightly stretched over the anterior portion of the fractured surface of the proximal fragment and fixed firmly to its osseous irregularities, ending in a fimbriated extremity, some of the shreds of which dip into the joint, while others are broken off near the posterior border of the articular patellar cartilage. (Figs. 3 and 4).

2. Shreds of greatly overstretched ligamentous structures lying in and fixed to the osseous irregularities of the fractured

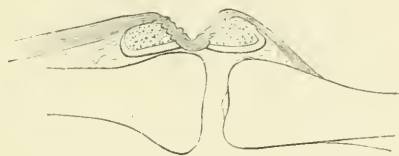


FIG. 5. TRANSVERSE FRACTURE OF PATELLA (longitudinal section with shreds of overstretched aponeurotic tissue extending in continuity from proximal to distal fragments and dipping down between them).

surface. These are more or less continuous transversely along the anterior border of the patella, but are scattered over the fractured surface as they approach the posterior edge. The lengths of these shreds are very varied, some not covering the whole fractured surface, while others not only do so but lie in the joint beyond.

3. Occasionally there are shreds of overstretched aponeurotic tissues adhering by their extremities to both proximal and distal fragments, while in the centre they fall into the joint in the form of long loops. (Fig. 5.)

4. In three instances bands of tissue existed which extended from the inner to the outer side of the joint running transversely. In the instance of this kind, which fell under personal observation, the band which was stretched across the



lower fragment slipped while an attempt was being made to place it front of the patella, it then lay between the joint and the bone. The lower fragment then became tilted in such a manner as to make it impossible to bring the fragments into close contact while this band existed in that position. In Mr. Hardy's case, a similar band actually lay under the lower fragment when he opened the joint. In such cases it is difficult to see how coaptation could be secured without removal of the band. The existence of bands of this kind lying under the patella, but which have not been suspected,

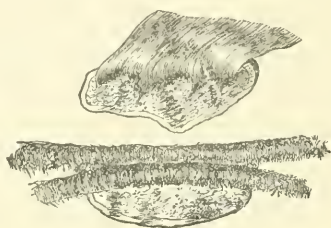


FIG. 6. TRANSVERSE FRACTURE OF THE PATELLA (fractured surfaces seen from before. Transverse band of aponeurotic tissue extending across the joint from inner to outer side, covering the posterior aspect of lower fragment).

may account for the exceptional difficulty, which has sometimes been met with, in approximating the fragments. Opening the joint, dividing the band, removing it, or replacing it in front of the patella, and securing it there, at once removes the difficulty.

5. The fractured surface of the distal fragment is generally much freer from aponeurotic tissue than the proximal one; but it also has its share. When the proximal one has a very large flap to cover it, the distal one is correspondingly free; though occasionally, when free from aponeurotic tissue, it is covered by the ruptured bursal floor.

6. The part of the fractured surfaces which is most free from these intervening structures is the posterior edge; hence, though it be impossible to elicit crepitation while rubbing the two fractured surfaces fairly against one another, it is often easy to do so, if the patella be tilted so as to bring the posterior edges together.

Having established this point in the pathology of transverse fractures of the patella, surgeons will be able to choose their own treatment and to measure beforehand what they are likely to expect from it. From these observations one must conclude that if osseous union be desired, the soft tissues ought to be removed from between the fractured surfaces. If this be not done, fibrous union will ensue, except in a few of those cases which have resulted from direct external violence. Regarding fibrous union of a fractured patella, some believe it to be satisfactory. The instances which have come under personal observation have been far from being so when traced during the first few years subsequent to the fracture. They look well in hospital, but several of them, after being treated for three or four months, have within various short periods of their dismissal, had the fibrous union so much elongated, or ruptured, that the leg was rendered again useless, except when supported by a back splint, or other mechanism. Occasionally, firmer union does occur, and the patient goes about with a useful limb; but no one at the outset of the treatment can presage the result of the fibrous union. The result is uncertain, and must be so, as long as there is this variety of disposition of intervening soft structures. It frequently happens that this fibrous union has formed not between bone and bone, but between the layers of intervening aponeurotic tissue; and when strain has been put on it, the attachments of the latter to the bone give way, thus leaving a band elongated by the length of the intervening substance. This is the explanation of the sudden lengthening of the connecting band which so often ensues. Osseous union is therefore desirable, and that method of treatment which can secure this end with a regularity which can be depended upon, is what ought to be aimed at. Mr. Millar, of Edinburgh, has recently tried to secure this by means of rubbing the fractured edges together without opening the joint, and says that he has had some good results. Under certain circumstances this might be sufficient. If, for instance, the fractured surface formed a transverse line evenly exposed, or exposed over the greater part of its extent, to the friction, and especially if the amount of aponeurotic tissue in-

tervening were not great, the result might be satisfactory. It is, however, comparatively seldom that such conditions exist, and as there may be difficulty in ascertaining from external manipulation, the precise form of the fracture, it is more certain and safer to expose the parts by incision. There may, however, be circumstances which may preclude opening of the joint. The patient's general health may be in such a state as to render any cutting operation hazardous; therefore, it is well to consider how best to carry out the attempt of removing the intervening præ-patellar tissues. With this view a few suggestions may be made. First, it ought to be borne in mind that osseous crepitation can be elicited by rubbing the posterior edges of the fractured surfaces together, but one must not therefore conclude that the whole width of the fractured surfaces are free, as it is frequently the case, that the posterior edges are exposed, when the whole of the remainder is covered with aponeurotic tissue. Second, osseous crepitation may be elicited from the bony projections penetrating the aponeurotic tissue which lies close to the fracture. Therefore, though osseous crepitation may be produced, one must not believe that the principal part of the aponeurotic tissues have been removed. Thirdly, the proximal fragment is the one which is principally covered by aponeurotic tissues and therefore it should receive most attention. Fourthly, as the intervening soft parts fall over the edges of the fractures from before backwards, one should endeavor to get rid of these structures, by scraping the one fragment against the other from behind forwards, so as to dislodge these tissues. This plan could not dislodge the transverse bands existing underneath the torn fragment.

Exposure of the fracture by a longitudinal incision is the surest way of effecting this purpose.

The treatment of fracture of the patella by opening the knee joint was introduced by Professor Cooper, of San Francisco, in 1861, and subsequently reintroduced by Professor Lister. The opening of the joint was resorted to, not for the purpose of removing the intervening soft tissues, as this had not been recognized as a cause of non-osseous union; but with the view of

wiring the fracture. By opening the knee-joint, the whole state of the parts lie at once revealed. All intervening structures ought then to be removed and accurate apposition of the fragments effected. With this view, other things being equal, the earlier the fracture is treated the better. A longitudinal incision, several inches in length, is made over the patella, the parts are carefully examined, the intervening aponeurotic and bursal structures are removed, the joint washed out, and the fractured surfaces brought into apposition by wire. The ends of the wire are left projecting from the wound, but turned down flat upon the skin; and at the expiry of six weeks are removed by untwisting the wire, cutting off one end and winding the remainder round dressing forceps.

Van der Meulen, of Utrecht, in wiring bones gives the wire a single twist, cuts off the redundancy, and hammers the extremities flat into the bone; and that practice has been generally adopted in wiring the patella. In bones such as the shaft of the femur, lying at a considerable depth from the surface, the practice is one which has advantages; but in bones so superficial as the patella, these are not apparent. After the union of the bone the wire remains as a useless foreign body, in many, probably in the majority, not doing harm; but in a few mechanically exciting irritation, leading occasionally to serious results. If union does not take place the wire will "eat its way out," by producing absorption or ulceration of the bone. In one such case, which came under observation three months after the patella had been sutured, the knee-joint was in a state of acute suppurative arthritis, with ulceration of cartilage. The fractured surfaces were still movable one upon the other, on firm lateral movement, they having only become united by soft fibrous union. A sinus existed over the patella, and on passing a probe, it came in contact with the wire which was surrounded by a carious condition of the bone. The twist in the wire was still intact, but the loop itself was loose; the osseous tissue having become inflamed, softened and ulcerated in front of it. Excision of the joint was demanded to relieve his sufferings. When the joint was opened, the wire was found to have eroded its way almost entirely through the proxima

fragment, leaving the osseous tissue in its wake inflamed and softened. From the history of the case and the examination of the joint, it appeared that the inflammatory condition had originated in the immediate neighborhood of the patella. The patient was a strong healthy man, and one who was unlikely to be the subject of joint disease arising from other than local irritation. So, looking on the possibility of irritation arising from the wire being left *in situ*, it seems better to remove it after it has served its purpose. At the expiry of six weeks the wire ought to be removed. This may be best done by first straightening the wire, cutting off the one end close to the wound and then grasping the other end in a pair of forceps (ordinary dressing) and winding the wire over it. In this way all jerking is removed and the wire is extracted evenly and steadily. (See Fig. 7).



FIG. 7. DRESSING FORCEPS; winding wire round them in process of removing it from the patella.

Regarding the re-establishment of movement in the joint all violence ought to be avoided, and passive movement ought to be undertaken with discrimination, or rupture of the fresh osseous union before it has been completely consolidated might ensue. The patient might, however, exercise the limb freely at the expiry of eight weeks. Massage greatly facilitates the freedom of the joint.

TRANSVERSE FRACTURES OF THE OLECRANON.—In transverse fractures of the olecranon a somewhat similar disposition of the aponeurotic tissue relatively to the fractured extremities obtains and in some cases is sufficient to prevent osseous union. Three instances of this kind have come under notice requiring operation, and in each the aponeurotic tissues were found intervening between the fragments.

CASE I. *Transverse Fracture of the Olecranon, Operated on Twelve Hours after the Accident.*

J. L., æt. 24, was admitted March 27th, 1883, suffering from a simple multiple fracture of the olecranon which he received by accident, though the precise mechanism of the injury could not be ascertained. There was a considerable gap between the fragments. An incision was made over the olecranon exposing the fracture. A dense layer of aponeurotic tissue lay over the fractured surface of the exposed fragment completely covering it. This tissue had been torn from the posterior surface of the distal part or shaft of the ulna. There was also a quantity of blood lying in the interval between the fractured surfaces.

These soft parts were elevated, and the bone was united by means of silver wire. There was no pus formation, and he ultimately had a strong, useful and freely movable arm. There was firm and apparent osseous union obtained.

CASE II. *Transverse Fracture of the Olecranon Exposed Three Hours after the Injury.* L. L., æt. 30, was admitted under observation in November, 1884, suffering from a fracture of the olecranon which he had received three hours previously while engaged in lifting a heavy weight on to a cart. The upper fragment was fully an inch from the lower one. On bringing the fragments into close contact no crepitation was detected, but a sensation was imparted as if blood clot had intervened. An incision was made over the fragments, and when exposed and the intervening blood removed, there was seen to be a flap of aponeurotic tissue lying over and completely concealing the proximal fragment, while on the ulnar border of the fractured surface, there were a few shreds of the same tissue. The flap of aponeurotic tissue lying over the upper fragment moved with it, and was slightly attached to it by means of its osseous irregularities, but it was not held together in the same firm way as the soft tissues in front of the patella are in transverse fractures of that bone. As long as this flap of tissue existed between the fragments it was quite impossible to obtain osseous union.

These tissues were elevated, and the fragments were brought together with wire. Firm osseous union was obtained along with free movement. There had been no increase of temperature and no second dressing was required.

CASE III. *Transverse Fracture of Olecranon—Exposed Twelve Hours after Accident.* S. P., æt. 34, came under observation in February, 1885. Had been engaged in a struggle with a comrade when he felt a something giving way in his right arm. This occurred about twelve hours before he entered hospital. On examination, the olecranon was found to be separated from the shaft, and on attempting



to elicit crepitation, none was detected, the effort imparting a soft sensation to the fingers. An incision exposed the fragments. There was little blood clot in the gap between the bones. The proximal fragment was partially concealed by shreds of aponeurotic tissue, which covered the greater part of its fractured surface. The part attached to the shaft of the ulna was likewise covered by shreds of tissue from the ligamentous structures behind. Some of these shreds were firmly fixed to the bone, but there were others which lay loosely between the fragments, being attached only to one of them.

These soft tissues were elevated, and after the bone was sutured they were brought together over the dorsal aspect of the fragments. The wound healed by first intention. Movements were commenced a few days after the wiring. The wire was withdrawn a month subsequently. The movements were free six weeks after the operation.

To these three cases may be added a fourth, which illustrates the manner in which fractures from direct violence are more likely to become united by osseous union than those which are the result of muscular effort.

CASE IV. *Compound Comminuted Fracture of the Olecranon.* In March, 1885, L. S., æt. 29, came under observation four hours after he had sustained a compound comminuted fracture of the olecranon by falling from a height on his elbow. The wound exposed the olecranon, broken into four fragments, which lay slightly separated from one another. There were very few of the fibres of the aponeurosis completely ruptured, though they were evidently considerably stretched, and a few were divided but lay on the surface of the fragments. Osseous crepitation was easily elicited on movements of the fragments in any direction. There was here no reason why osseous union should not take place, as there was nothing to prevent it. It presented quite a contrast in this respect to the others cases mentioned above.

The wound was treated in the usual way, there was no suppuration and only one dressing was required. Firm osseous union resulted, but there was considerable stiffness, especially at first. Ultimately, he was able to flex the arm sufficiently to touch his mouth and to extend it almost completely.

# THE TREATMENT OF INVETERATE TALIPES EQUINO-VARUS BY OSTEOTOMY.<sup>1</sup>

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THE management of cases of congenital equino-varus which have resisted all the usual methods of mechanical treatment—tenotomy, stretching, etc.—has received much attention from surgeons, and various operations have been proposed for its correction. The majority of infants with this deformity are and can be cured by mechanical treatment, but there is a certain number of persons who, either from the marked degree of the deformity, neglect or inefficient treatment, are unable to walk on the plantar surface of their feet, and in whom locomotion is labored and painful. Even in children it is sometimes impossible to hold the foot in a proper position without the aid of an apparatus after years of careful treatment. With the brace applied they are able to walk on the plantar surface of their feet, but, as soon as it is removed, the anterior portion of the foot reverts to its abnormal position.

The cause of this failure to relieve the deformity is not clearly understood or, if acknowledged, is not appreciated by many surgeons. The muscles, ligaments and bones have each and all been assigned as the cause of the deformity, and operative treatment has been directed to that tissue which, in the judgment of the surgeon, is the one at fault.

In order to understand the cause of this inability to hold the anterior portion of the foot in a proper position and, when an operation is called for, to judge of the best means of correcting the deformity, a consideration of the anatomy of congenital equino-varus is necessary.

<sup>1</sup>Read before the New York Surgical Society, December 8, 1886.

Through the kindness of Dr. J. B. Bissell I have had the opportunity to examine the bones taken from a child eight months of age who exhibited this deformity.

When the foot is viewed with the anterior portion placed in its abnormal position, the deformity does not appear to be one of marked degree.

The patient had been under treatment for some months, and at the time of death the anterior segment of the foot had been brought into its normal position and held there as long as the splint was on, but on its removal, had immediately reverted to its abnormal position. The tendo Achillis had been divided.

On examining the bones, changes are found in the shape of the os calcis, astragalus and scaphoid bones. The trochlear surface of the astragalus is longer in its antero-posterior direction and is more flattened posteriorly, than in the normal bone. The body is more angular, being broader in front. If an imaginary line is drawn at right angles to one bisecting transversely the articular surface of the body, it will be found that the neck is set upon the body at an angle of  $55^{\circ}$ .

The external aspect of the neck is greatly elongated. The direction of its external border from where it springs from the body is forward and inward, and presents a straight line; the inner border is much shorter.

On account of this obliquity of the neck, the head of the bone is directed forward and inward so that it is at right angles with the longitudinal axis of the body of the bone; the head is smaller and more conical than in an astragalus taken from a normal foot. The head of the bone from the left foot presents two facets, the planes of which meet at an obtuse angle; the inner articulates with the scaphoid; the outer looks forward and is unopposed. The head of the bone from the right foot does not show any division into facets. Its general shape in front of the body is conical and has not the globular appearance of the head of the normal astragalus.

The os calcis appears to be of normal shape and size in its posterior segment. The anterior portion is curved from before backward, the convexity being directed outward, and its anterior articulating surface looks forward and inward. It also

extends farther forward than in the normal bone and is therefore elongated. The scaphoid is carried upward and inward by the head of the astragalus, and has a facet on its upper and posterior (lateral) border which articulates with the anterior portion of the malleolus. The rest of the bone seems normal. The other tarsal bones present nothing to contribute to the deformity.

The ligaments upon the inner side of the foot are greatly shortened—namely, the anterior portion of the internal lateral ligament of the ankle joint, the astragalo-scaphoid, the calcaneo-scaphoid and also the inner portion of the plantar fascia. These hold the navicular bone and the head of the astragalus in their abnormal position.

The question naturally arises, how much these bones here described differ from those of the normal infantile skeleton. Mr. Adams states that the neck of the normal infantile astragalus at term look directly forward.

In a bone taken from a child eight months of age with normal feet it is found that the neck is set upon the body of the bone at an angle of  $28^{\circ}$ . The external portion of the neck is not elongated, and the head and neck are not conical; it also presents a much larger articulating surface.

The os calcis is curved on its lower posterior border, the concavity looking downward and the line of its external aspect from the tubercle forward is straight or, if anything, is a little concave; certainly not curved with the convexity directed outward. The anterior articulating surface is directed forward.

In comparing these bones, the following are their points of difference:

The angle at which the neck of the astragalus is set upon its body in the bone from the deformed foot is  $55^{\circ}$ , while that of the normal bone is  $28^{\circ}$ . The external surface of the neck of the abnormal is much longer than that of the normal bone; the articulating surface of the head is much smaller in the former than in the latter.

The anterior articulating surface of the os calcis is directed forward and inward in the bone from the deformed foot, while

in the normal it is directly forward. Its anterior portion is curved outward in the deformed foot, but is straight in the one from the normal foot.

Mr. Adams, in his work on club-foot, describes the same changes in the astragalus and os calcis as those mentioned above, except that he does not notice the change in the direction of its anterior articulating surface nor its elongation.

He considers any deviation of the axis of the neck of the astragalus from a straight line with that of the body as pathological.

Mr. Parker and Mr. Shattock, in a paper published in the "Transactions of the London Pathological Society" for 1884, give the result of their dissection of feet affected with talipes equino-varus, and compare the astragalus and os calcis with normal infantile bones.

They state that they find that "the normal astragalus of infants differs considerably from that of the adult in the direction and extent of the articulating facet of the head and in the obliquity of the neck." As a basis of comparison they made measurements of the obliquity of the neck in twenty specimens of adult astragali taken promiscuously. The mean angle at which the neck was set in the body of the bone was  $10.65^{\circ}$ , the maximum was  $26^{\circ}$ , while the minimum was so small that to measure it was impracticable. In the fœtus, from about the fourth month to term, in eleven cases the mean angle was  $38^{\circ}$ , maximum  $42^{\circ}$ , minimum  $35^{\circ}$ . In five cases of varus the mean angle was  $49.6^{\circ}$ , the maximum  $64^{\circ}$ , minimum  $31^{\circ}$ .

From these facts it would seem proved that the obliquity of the neck of the astragalus is a normal condition in infants at term; that in varus, as a rule, the amount of the obliquity is increased and that in the adult bone the neck is set upon the body of the bone at a mean angle of  $10.65^{\circ}$ ; that in varus the anterior portion of the os calcis is curved with its convexity looking outward, and that its anterior articulating surface is directed forward and inward. It is evident, then, that during growth the axis of the neck of the astragalus in the normal foot changes from an angle of  $38^{\circ}$  to one of  $10.65^{\circ}$  with that of the longitudinal axis of the body.

It is a well-known fact that at birth the feet of infants are in a position of slight varus. The age at which the neck of the astragalus assumes the adult position has not been determined, nor am I aware of any fact bearing on the point. Many recent writers on this subject attribute this deformity to the position of the feet *in utero*, and consider that the change in the shape of the neck is due to long continued inversion of the feet and that the head and neck are held in this abnormal position by shortened ligaments. The alteration in the os calcis may be attributed to traction from the displaced bones on the inner aspect of the foot. The pathological changes found in the majority of cases of congenital talipes equino-varus may be described as an exaggerated obliquity of the neck of the astragalus and curvature of the anterior portion of the os calcis, together with its elongation, and that the head of the astragalus is held in its abnormal position by short ligaments; that the scaphoid is carried upward and inward by the astragalus and held there by the abnormal condition of the ligaments; that the muscles have nothing to do with its causation, nor do they act as much of an obstacle to the restitution of the foot. Exception should however, be made to muscles entering into the formation of the tendo Achillis.

It should be stated that in one dissection, reported by Mr. Parker and Mr. Shattock, of congenital equino-varus the obliquity of the neck was only  $31^{\circ}$ , being less than in the normal bone.

If the foregoing facts have been correctly interpreted, the indications for the treatment of congenital equino-varus seem simple. The object of mechanical treatment must be to stretch the ligaments upon the inner side of the foot, which hold the scaphoid and head of the astragalus in their abnormal position, so that the obliquity of the astragalus may undergo the diminution incident to normal growth or, in other words, assume the form of the adult astragalus. There is still another element, in some cases at least, which prevents a perfect restitution and that is the elongation of the os calcis. Even should the deformity of the astragalus be entirely overcome, the outer border of the foot would be longer than its inner and thus con-



tinually tend to force its unsupported anterior segment inward.

In cases which have resisted all known methods of mechanical treatment the question arises, What operation is the best to restore the foot to a useful position? All operative procedures may be considered under two heads: section of ligaments and operations upon the bones. In 1881 Dr. A. M. Phelps divided all resisting bands and ligaments by cutting down through a large wound on the inner side of the foot until he was able to bring the parts into their normal position, and then allowing the wound to cicatrize while the foot was held in a straight position; fourteen weeks after the operation a club-foot shoe was applied. In another case the same operation was performed, leaving an open wound one inch and a half wide and extending down to the bone; there is no later report of these cases so far as I am aware.

Mr. R. W. Parker published a paper in the *Brit. Med. Jour.*, July 3, 1886, in which he advocates subcutaneous division of the ligaments on the inner side of the foot and then correcting the deformity. He states, however, that there are some cases in which this method will fail, and tarsectomy must be performed.

Mr. Little advocated the removal of the cuboid, and Soliy excised that bone in 1854, but it did not prove a success; it has been performed in this country by Stephen Smith, but it, too, was a failure, and Syme's amputation was subsequently performed. The operation seems to have been abandoned until 1874, when Richard Davy reintroduced and performed it in six cases; he reports them successful. In 1881 Mr. Laud removed the astragalus by gouging, but it does not appear that his patient ever walked without support. Other operators have removed the bone, but with varying success, the ankle joints being left stiff, and in many cases an apparatus had to be worn.

Otto Weber in 1886 removed a wedge-shaped piece of bone, including a portion of the cuboid and os calcis; and Davies Colley performed a wedge-shaped excision of the tarsus in 1875. Since then Mr. Richard Davy has been a most ardent advocate of the operation. There is no question that a cunei-

form osteotomy for persistent club-foot is an excellent operation, the only question being as to where the wedge should be taken from; all operators have made the cuboid at least form the base of the wedge. Mr. Davy says that it almost invariably includes portions of the os calcis, astragalus, and scaphoid bones. In one case he removed a portion of the os calcis, the head of the astragalus, and the whole of the scaphoid. Some surgeons have gone farther forward, like Barwell, who removed portions of the anterior row of tarsal bones. By these operations the foot is much shortened, and many of the tarsal joints are destroyed; the patient walks, it is true, on the plantar surface of what remains of his foot, but with ankylosis of all the joints but the ankle and those in front of the first row of tarsal bones.

From a study of the bones from feet affected with talipes equino-varus, it is evident that the real trouble lies not in *front* of, but *behind* the medio-tarsal joint; and that all operations on the bones in front of this point are anatomically and mechanically wrong.

The only operation that of late years has commended itself to surgeons is a cuneiform osteotomy or resection of the tarsal bones in front of Chopart's joint; all others have failed to accomplish the end for which they were performed, and have been abandoned.

Tenotomy of the ligaments commends itself as one from which good results may be expected in infants, because it attacks the structure which is the chief obstacle to the normal development of the astragalus, but it has no influence on the curvature of the os calcis, and this, it would seem, is the cause of imperfect restitution in otherwise promising cases.

In looking at a dissection of a foot affected with the deformity under consideration, the following points suggested themselves:

1. That the inability to correct the deformity was due to changes taking place in the astragalus and os calcis.
2. That, in order to bring the anterior portion of the foot into its normal position, the curvature in the os calcis must be removed and the neck of the astragalus shortened, so as to

allow its head to point in the normal direction and thus carry with it the scaphoid and other tarsal bones.

To accomplish this, the following operation was performed: An incision was made from a point one inch and a half in front of the tendo Achillis on the outer aspect of the foot forward to the middle of the cuboid bone, and down to the tendons of the peroneus longus and brevis: These should be raised or pushed out of the way. Another incision, beginning from the middle of the first and corresponding to the neck of the astragalus, was made directly upward; the tissues were then raised from the bones and the periosteum incised over that part of the os calcis from which it was desired to remove the wedge. With a chisel a V-shaped piece of bone was taken away, base outward, and its apex extending to its inner border; a wedge was then removed from the neck of the astragalus of such a shape as to allow the anterior portion of the foot to be brought outward and upward. The periosteum was united with catgut and the skin with several wire sutures, because the latter held longer and gave better support. An aperture was left posteriorly for the insertion of a drainage-tube; a plaster-of-Paris bandage was applied, extending from the toes to above the knee, and the foot was placed in a corrected position; the wound was dressed with iodoform gauze.

The size of the V-shaped interval left after the removal of the wedge of bone was sufficient to allow the anterior portion of the foot to be placed in a proper position without any tension on the tissues on its inner aspect. I think that a subcutaneous division of the ligaments on the inner border of the foot, when they are tense, would facilitate the correction.

The dressings should be as light as possible, not bulky. Otherwise it will be found difficult to apply the plaster-of-Paris bandage firmly; a little over-correction does no harm.

The advantages maintained for this operation over that of removing a wedge from in front of the medio-tarsal joint are:

1. It is anatomically and mechanically correct.
2. A smaller amount of bone has to be removed, because the operation is performed nearer the apex of the triangle.
3. No joint is opened, and, consequently, the foot is left in a more normal condition.

4. It does not practically shorten the foot in front of the ankle joint.

The class of cases suitable for this operation are :

1. Those of patients who have reached the age of 5 or 6 years with the deformity unrelieved, who have walked on their feet, and in whom the parts are rigid and the deformity marked.

2. Those cases in which, although the anterior portion of the foot can be brought into position, yet require an apparatus to retain the foot in its normal position after years of careful treatment.

3. Those cases in which the obstacle to restitution is due to elongation of the os calcis ; perhaps in these patients the removal of a small wedge from that bone would accomplish the result.

CASE I.—W. S., ten years of age, was admitted into St. Luke's Hospital, in September, 1885, with congenital talipes equino-varus of the right foot. The deformity had never been treated; walks on the outer side of the foot. The parts were rigid, and with the hand no change could be made in the position of the anterior portion of the foot; there was no motion at the ankle joint.

In October the tendo Achillis was divided, and Bradford's instrument for forcibly rectifying club-foot used; but no impression could be made on the position of the foot. In November another attempt was made with the same instrument, but with no better success. On January 14, 1886, I performed the operation advocated in this paper, and brought the anterior segment of the foot into a straight line. There was considerable oozing of blood for a day, so that the dressings had to be changed, and, in a week there was some slight suppuration. During the treatment he had an attack of scarlet fever. The wound all closed within a month, but he was not allowed to use his foot for eight weeks. At the date of his discharge from the hospital he was able to walk well, with his foot flat on the floor. There was but little motion at the ankle-joint. The line of the inner and outer borders of the foot was perfect, with not the slightest tendency to inversion.

CASE II.—A. S., eight years of age, was admitted into the hospital in November, 1885, with double congenital talipes equino-varus. His tendons had been cut, and he had been under mechanical treatment for years, but with no benefit. The os calcis was in its normal posi-

tion, but the anterior portion of the foot was turned at a right angle to the os calcis. Three attempts had been made to correct the deformity with Bradford's instrument, but without making any impression on the position of the foot.

*December 25, 1885.*—A wedge was removed from the os calcis and neck of the astragalus in the same manner as mentioned above; the wound was all closed in a few weeks, the temperature not reaching beyond 100°.

*February 6, 1886.*—The same operation was performed upon the right foot; the date of his discharge the patient was able to walk with the sole of the foot flat on the floor. He had always had some paresis of the extremities, so that he had never had good use of his limbs. He walked, at the time of his discharge, quite well; but there was a tendency of the whole foot to point inward. I do not think the correction was as perfect as in the first case.

CASE III.—M. J. C., æt. fourteen, has been under treatment at the hospital at times for several years. She has had a congenital talipes equino-varus of left foot, which has been corrected so that the anterior portion of the foot can be brought into its normal position with the hand, but immediately on removal of the support it turns somewhat inward. She has worn a brace for several years; with it she gets along pretty well, but without it the foot is almost useless.

*February 28, 1886.*—A V-shaped piece of boue was removed from the os calcis and the neck of the astragalus, and the anterior portion of the foot placed in a straight position. A plaster-of-Paris splint and dressings of gauze and iodoform, as in the other cases, were used. Owing to illness, I did not see the patient again for a week; she then had a high fever, the foot was swollen, and the wound looked blue and sloughy; the splint was removed and the wound dressed, the fever continued, and she died on the twelfth day, of septicæmia.

## A CASE OF CALCULUS PREPUTIALIS.

By A. R. JENKINS, M. D.,

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CASE. Solomon W., negro male, æt. 30, applied on account of pain and enlargement of penis. Found fantastically long prepuce, with high grade of stenosis of orifice, also great induration and œdema—apparently of glans.

Accompanying, was outspoken lymphangitis and inguinal adenitis. From the orifice of the prepuce flowed a purulent, stinking secretion, suggestive of carcinoma.

This condition, he said, had lasted for several months.

I was in doubt whether I had to do with a neoplasm or a syphiloma. Excised two inches of the prepuce, when two concavo-convex calculi were turned from out the neck of the gland, one on either side. Their average diameter was about 2 centimetres; greatest thickness, 1 centimetre. There were several ulcers. (Ulcus decubitus preputii?) in the greater preputial lacunæ. Cured.

The calculi in this case were probably conglomerate of sebum preputiale and urinary salts.

This condition is exceedingly rare. Lewin found only 15 cases mentioned in literature. Nelson found in the preputium of a Chinaman 38 calculi. (*Spec. Chir.*, Carl Hüeter s., 335 u. 366). Brodie reports finding 60. (König, *Chirurgie*, 1, 592.



## EDITORIAL ARTICLES.

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### THE SURGERY OF THE LIVER.

As long ago as 1830 Bégin,<sup>1</sup> of Val-de-Grace, cut through the abdominal wall and the parietal peritoneum—not down to it, as is usually stated—for the exposure of a hydatid cyst, and, stuffing the wound with charpie until adhesions had taken place between the lips of the abdominal wound and the liver, opened and evacuated the cyst. Five years previously, Récamier<sup>2</sup> had conceived this operation, but had not put it into execution, preferring instead the application of caustics on the external surface of the abdominal wall for the purpose of inducing adhesive inflammation, and opening the abscess or cyst cavity at the site of the adhesions. The terror with which the peritoneum was regarded by surgeons of the intervening epoch prevented the acceptance of the operation of Bégin, and, up to the time of Dieulafoy's invention of the aspirator, abscess of the liver was treated, when treated at all, by incision, after adhesion with the abdominal parietes had been induced naturally or artificially. To the average practitioner of surgery the liver was a sealed book. The remarks of Budd<sup>3</sup> well express the sentiment of the times with regard to operative intervention in abscess of the liver, the first affection of that organ to be attacked by the surgeon: “From what I have seen and read of hepatic abscesses, it seems to me that the proportion of recoveries has been just as great or even greater when the abscess has opened into the lung or the bowel, as when it has made its way through the side, and I can only explain the circumstance by the fact that, when an abscess has pointed at the side, it has seldom been allowed to open of itself. When the abscess is large and has existed long, its walls are thick and

<sup>1</sup>*Jour. hebdom., t. i., 1830.*

<sup>2</sup>*Revue méd. et étrang., t. vi, 1825.*

<sup>3</sup>On diseases of the liver. By George Budd. Lond., 1852.

unyielding, and it has in consequence still less disposition to close up. When an abscess of this kind opens of itself, either outwardly or into the intestine or lung, matter continues to be discharged and the patient generally dies, worn out by the protracted suppuration. When the abscess is opened by the knife, the same thing, of course, happens and *the patient dies the earlier for our meddling.*" [Italics ours, Ed.]. As late as 1878, Agnew<sup>1</sup> particularly cautions against premature opening of hepatic abscesses, considering it important that the work of inflammatory consolidation between the gland and the abdominal wall be thoroughly accomplished; when pointing takes place, accompanied by fluctuation, and the skin over the swelling assumes a purple discoloration, the abscess should be opened by making a puncture with the ordinary sharp-pointed bistoury. It is difficult to understand how so learned a surgeon could have omitted in this connection any reference to the aspirator, presented to the profession by Dieulafoy eight years before,<sup>2</sup> and by the same surgeon studied in its application to abscess of the liver<sup>3</sup> six years before. Aspiration by its utility as a means of diagnosis and treatment, marked a new era in the treatment of abscesses of the liver and, in the hands of its inventor, of Condon, Maclean, Hammond and many others it has produced remarkable results. Ball<sup>4</sup> aspirated 51½ ounces of pus from an abscess of the liver in two operations, obtaining a complete cure. Nevertheless, while efficient in case of small abscesses, it has not proven the *ne plus ultra* for larger ones.

With the introduction of antiseptic methods and the consequent expansion of abdominal surgery, attention was again attracted to the treatment of hepatic abscesses by free incision and drainage. In the beginning, surgeons resorted again to the method by preliminary adhesion secured by caustic, puncture or incision, after which the cavity was opened antiseptically and drained; but later, with the courage

<sup>1</sup>Principles and Practice of Surgery. By D. Hayes Agnew, vol. 1, p. 362, Phila., 1878.

<sup>2</sup>*De l'aspiration pneumatique sous-cutanee.* Par Georges Dieulafoy, Paris, 1870.

<sup>3</sup>*Du diagnostique et du traitement des kystes hydatiques et des abcès du foie par aspiration.* Par Georges Dieulafoy, Paris, 1872.

<sup>4</sup>*Lancet*, Dec. 1, 1877.

born of experience, the operator came to open the abdominal cavity boldly, suture the lips of the parietal wound to the liver and evacuate the pus. Proper drainage and antiseptic dressings completed a treatment, which has produced almost uniform success. A case presented at the last meeting of the British Medical Association by Thornton<sup>1</sup> is unique in that it was attacked through the pleura. A man, æt. 43, had been affected fifteen months previously with an abscess of the left lobe of the liver, which had been treated successfully by aspiration. After two months, the trouble returned and the right side of the liver was aspirated between the ribs, removing a quantity of sweet pus, but without relieving the symptoms. Dr. Thornton being consulted, determined to use the mark of the needle as a guide to free incision and drainage of the cavity. He first removed a lozenge-shaped piece of skin, a method which he strongly recommends in cases in which it is advisable to keep an opening for drainage. Careful dissection soon opened up a perfectly healthy pleura, with no sign of adhesions. Knowing that the abscess was deeply situated and that it could be reached by this way, although an abscess should not be opened into a perfectly healthy pleura, he determined to attempt to sew the two layers of the pleura together and thus obtain a funnel through which he could proceed, without fear of letting pus escape into the pleural cavity. He first raised the parietal pleura all around so as to get a little free edge, and then made a very careful longitudinal incision through the visceral pleura, raised it all around with a blunt director and then, with a fine curved needle, united the two layers of the pleura firmly together with a continuous silk suture. Having thus got a channel, he dissected down to the liver substance and plunged in one of Fayrer's grooved hepatic trocars, reaching the pus through a considerable depth of liver tissue; and, using the groove in the trocar as a director for a probe-pointed bistoury, the incision was enlarged and a drainage tube inserted. With antiseptic care a rapid cure ensued.

Briefly then, the surgical treatment of hepatic abscess may be said to be: (1). Aspiration first in all cases except those which have pro-

<sup>1</sup>The surgical treatment of diseases of the liver. By J. Knowsley Thornton. *Brit. Med. Jour.*, vol. ii, 1886. p. 901.

gressed so far as to point externally, in which free incision and drainage should be the immediate resort. (2). In case of a tendency to refill, in default of an amelioration of the symptoms or in those cases about to open externally spontaneously, free incision, suturing the liver to the abdominal wall, if no adhesions exist, complete evacuation of the pus focus, drainage and antiseptic dressing. (3). In case of deep intra-hepatic deposits, and those which cannot be reached without wounding large vessels, the treatment is as yet unsettled. Aspiration and the injection of an ethereal solution of iodoform, according to the method of Verneuil, may be of advantage.

HYDATID CYSTS.—In the treatment of hydatid cysts of the liver, medical methods are noteworthy only for their inefficacy. The procedures of simple puncture, the acupuncture of Trousseau and electrolysis have not given results such as to entitle them to be received into the category of recognized methods. The procedures of Bégín and Récamier have already been noticed, but it may be remarked that the method of the former was practically that of Volkmann, to be noted presently.

Boinet treated hydatid cysts by puncturing them with a large trocar, for the canula of which was substituted after eight or ten days, a rubber tube for drainage. This method required a long time for obtaining final results, the evacuation of the contents of the cyst being slow. Blachez,<sup>1</sup> in 1868, observing this objection, devised the plan of treating the cysts by multiple openings with caustic, his idea being that they would facilitate the introduction of drains, the passage of injections and the outflow of cystic fluid, and that they could be easily connected by an incision after adhesive inflammation had set in.

This would seem to have been the forerunner of Simon's method of introducing two trocars into the more prominent part of the tumor, about an inch and a half apart, and allowing a part of the fluid to flow out. The trocars were then kept in place by an antiseptic dressing until the fluid which flowed out was found to be purulent, indicating the production of adhesive inflammation, upon which the intervening tissue was divided and the cavity opened and divided. This

<sup>1</sup>*Gaz. hebdom.*, 1868.

method has been modified in some respects, notably by Hirschberg, who made a series of punctures along the line of the final incision, to more surely obtain adhesion, and by Küster, who divided the intermediate tissue by the elastic ligature.

Morris<sup>1</sup> advocates the treatment by puncture and evacuation of the cyst by a fine trocar or an aspirating needle, after the method of Dieulafoy,<sup>2</sup> with two exceptions: (1). When the cyst contents are very largely composed of daughter cysts instead of fluid (2) and when suppuration has already set in. In these cases free incision should certainly be employed. He presents a table of 17 cases of hydatids of the liver, treated by this method in the Middlesex hospital between 1870 and 1882. Of these, 4 were afterward freely incised and drained. In one case, free incision was performed at once. Of the 17 cases, 4 terminated fatally, 3 of these being cases in which free incision followed the tapping.

All these methods are subject to the objections of long duration and the danger that the contents of the sac may enter into the peritoneal cavity and excite hydatid disease there.

The operation of Volkmann would seem to obviate the latter objection. It is performed in two stages as follows: (1). An incision is made about three inches in length, parallel to the false ribs and involving all the soft parts down to the peritoneum. When hæmostasis has been obtained, the peritoneal layer is opened in the entire length of the incision and the wound dressed with iodoform gauze. (2). After five or six days, when adhesion has occurred between the peritoneal layer of the wound and that of the tumor, the tumor is incised, the contents evacuated, the cavity cleaned with an antiseptic solution, drainage provided and the wound dressed antiseptically. This operation has been attended with a success remarkable as compared with that of the old methods by caustic and canula, Lihotzky having collected 17 cases, all of which were successful.

The method of Lindemann, devised independently and about the

<sup>1</sup>Injuries and diseases of the abdomen. By Henry Morris. *Internat. Encyclop. of Surgery*, vol. v, p. 1,046, *et. seq.*

<sup>2</sup>*loc. cit.*

same time by Sanger, is similar to that of Volkmann, with the exception that it is completed in a single operation, thus obviating the objectionable feature of that method. Lindemann cuts down to the cyst as in the method of Volkmann, including the parietal peritoneum, which is sutured to the skin with catgut. From one angle of the wound to the other, through the cyst wall and parallel to the long axis of the wound, he passes two catgut sutures, to draw the cyst into close apposition with the lips of the cutaneous wound, and incise the tumor between them; when the contents of the cyst are evacuated, the operation is completed by suturing the protruding edges of the cyst-wound to the lips of the external wound and applying suitable dressings. This method efficiently prevents the entrance of any of the contents of the cyst into the abdominal cavity and obtains a cure as quickly as it is possible.

Landau cuts down to the liver with due antiseptic precautions, but, instead of passing sutures parallel to the axis of the wound, passes perpendicular to it at each angle a strong thread, including the abdominal and cyst walls in the suture. Then a quantity of the fluid is drawn off by the aspirator, after which the relaxed walls of the cyst can be drawn out through the wound and opened entirely external to the abdominal cavity, and the contents removed without danger to the peritoneal cavity. This done, as much of the cyst wall as possible is excised and the lips of the wound sutured to the edges of the abdominal incision.

The history of these operations shows a marked freedom from fatal results. Lihotzky reports 17 operations by Volkmann's method without a death. The accompanying tables, including all the cases tabulated by Poulet,<sup>1</sup> with a number of others, comprised 64 operations, of which 12 were done by the method in two stages, with no death attributable to the operation, and 53 by the method in one sitting, with but 8 deaths, of which but 4 can be attributed to the operation, giving the operation a mortality of but 7 per cent.

<sup>1</sup>*Des nouvelles methodes de traitement des kystes hydatiques du foie. Par le Dr Poulet (Val-de-Grace). Revue de chirurgie, June, 1886.*



TABLE I.—OPERATIONS IN TWO STAGES

No.	Date	Operator.	Sex and Age.	Locat'n	Operative Details and Complications.	Result.	Authority.
1		Trendelenburg.	Not specified.	Not specified.		Cure.	Mecklenb. Samml., '85, No. 101.
2	July 18, 1878.	Trendelenburg.	"	"		Prolonged fistulous period; death '79.	Loc. cit., 1878, No. 102.
3		Trendelenburg.	"	"		Cure.	Loc. cit., No. 104.
4		Rudolphi.	"	"		Cure.	Loc. cit., No. 108.
5		Madelung.	"	"		Cure.	Loc. cit., No. 143.
6		Heusner.	"	"	Complicated case.	Cure.	Deutsch. Med. Woch., No. 49, '84.
7		Schmid.	"	"		Cure, but death from pleurisy on the 14th day.	Cent. f. Chir., June 27, 1885.
8		Lihotzky.	"	"		Cure.	Zeitschr. f. chir. Bd. xxii., '8.
9		Lihotzky.	"	"		Cure.	Loc. cit.
10		Lihotzky.	"	"		Cure.	Loc. cit.
11		Maydl.	"	"		Cure.	Loc. cit.
12		Suslin.	Female, æt. 22.	"	Complicated with perforation of the diaphragm and pleura.	Rapid cure.	Revue des Sc. Med., 1886, t. xxvii., p. 674.

TABLE II.—OPERATIONS IN ONE SITTING.

No.	Date.	Operator.	Sex and Age.	Locat'n	Operative Details and Complications.	Result.	Authority.
1	July 8, '71	Lindemann	Female æt. 36			Cure Sept. 23	Langenbeck's Arch. Bd. xxxiii
2	June 19, '78	"	Male æt. 20			Cure Aug. 20	Loc. cit.
3	Aug. 19, '78	"	Female æt. 24	Left lobe	Empyema; hepatic abscess	Death from pyæmia Nov. 9	Loc. cit.
4	Sept. 9, '78	"	Female æt. 30			Cure Dec. 17	Loc. cit.
5	Sept. 17, '79	"	Male æt. 8		Pleurisy	Death Oct. 6	Loc. cit.
6	Mar. 1, '80	"	Female æt. 28			Cure June 19	Loc. cit.
7	Dec. 16, '81	"	Female æt. 30			Cure	Loc. cit.
8	Mar. 19, '85	"	Female æt. 37			Cure May 19.	Loc. cit.
9	'85	"				Cure	
10	'85	"				Cure	
11	'85	"				Cure	
12	'76	Sänger	Male			Cure in 3 wks	Berlin Klin. Woch., '77
13	Sept. 14, '79	Landau	Female æt. 12			Cure Nov. 17	Loc. cit. '80
14	Oct. 15, '82	Leisrink	Male æt. 36		Two isolated cysts, treated in two operations	Cure Jan. '83	
15	Nov. 24, '82	"	Male æt. 36				
16	Mar. 31, '81	Asmuth	Female æt. 35			Cure	Langenbeck's Arch. Bd. xxxiii.

TABLE II CONTINUED.

No.	Date.	Operator.	Sex and Age.	Locat'n	Operative Details and Complications.	Result.	Authority.
17	June 13, '83	Vogt-Wisniewski	Female æt. 25			Cure	Loc. cit.
18	Nov. 22, '82	Madelung	Male æt. 25		Adherent to the intestine	Death 2d day from collapse	Loc. cit.
19	Nov. 9, '83	Grunberg	Male æt. 32			Cure	Loc. cit.
20	'80	Thornton	Female æt. 22		Very large cyst.	Death in 13 hours from septicæmia.	Cent. f. Chir., '83.
21	'83	"	Female æt. 41			Cure in 4 w'ks.	Loc. cit.
22		Küster				Cure.	Congress of German surgeons, '82
23		Oliver				Cure.	Lancet, '83
24	'84	Puky				Cure.	Langenbeck's Arch., Bd. xxxi
25	'85	Heusner			Resection of ribs.	Cure.	Deutsch. Med. Woch.
26	'85	Schmid				Doubtful.	Cent. f. Chir. '85
27	'85	Kusmin	Female	Left lobe	Cyst had perforated the inferior vena cava and a prolongation passed into the vena cava and right auricle.	Death due to sudden occlusion by the prolongation of the cyst.	Lancet, '85, ii, p. 78
28	'85	Schede			Resection of ribs.	Cure.	Meckl. Samml
29	'85	Madelung			" "	Favorable progress at first but death after 6 weeks of hæmorrhage from a duodenal ulcer.	Meckl. Samml No. 130

TABLE II CONTINUED.

No.	Date.	Operator.	Sex and Age.	Locat'n	Operative Details and Complications.	Result.	Authority.
30	'85	Marung				Cure.	Meckl. Samml No. 130
31	'83	Batchelor	Female æt. 34	Under surface	Patient 3 months advanced in pregnancy; adhesions to omentum.	Cure in two weeks without affecting pregnancy.	Austral. Med. Jour, '83
32	'85	Terrier	Female æt. 19	Under surface	Median incision.	Cure in four months.	Bull de la Soc. de Chir., '85
33	'	Monod	Female			Cure with persisting fistula.	Loc. c t.
34	'85	Richelot	Male		Incision in the linea alba.	Cure; fistula; death after a second operation.	Loc. cit.
35	'85	Lucas-Champonnière		Anterior border		Cure	Loc. cit.
36	'85	Terrier	Female	Under surface.		Cure in two months.	Loc. cit. '86
37	'85	Poulet	Male æt. 32	Anterior face	Incision parallel to false ribs.	Cure in fifty days with weakening of abdominal walls.	Revue de Chir. '86
38	'85	Weir.	Male æt. 26	Right lobe	Separate tumor of mesentery.	Death on the tenth day from renal & septic complications.	N. Y. Surg. Soc. Feb. 24 '85
39	'86	Segond Reclus	Male	Intra hepatic	Incision parallel to false ribs.	Cure slow; persistent fistula.	Gaz. Hebdom., '86.
40	'86	Reclus and Fereol	Male		Incision parallel to false ribs; suppurating cyst.	Cure in 96 days; fistula.	Soc. de Chir. '86.
41	'86	Cripps			Two large cysts extirpated.	Cure.	Lancet, 1 '86, p. 879.

TABLE II CONTINUED.

No	Date	Operator	Sex and Age.	Location.	Operative Details and Complications.	Result.	Authority.
42	July 16, '80	Tait	—æt 57			Cure	Brit. Med. Jour., ii, '86, p. 905.
43	Feb. 9, '81	"	—æt. 28			Cure	Loc. cit.
44	Feb. 15,	"	—æt. 20		These operations all consisted simply in opening the abdomen, emptying the cyst, opening it, cleaning it out and stitching the wound in the liver to that in the parietes, so as to form a fistula. A drainage tube was kept in until union between the two peritoneal surfaces had taken place, or the diminished quantity of the discharge indicated the possibility of removing the tube.	Cure	Loc. cit.
45	May 20, '81	"	—æt. 7			Cure	Loc. cit.
46	Aug. 15, '81	"	—æt 63			Cure	Loc. cit.
47	Nov. 4, '81	"	—æt. 25			Cure	Loc. cit.
48	Oct. 7, '85	"	—æt. 22			Cure	Loc. cit.
49	May 7, '82	"	—æt. 38			Cure	Loc. cit.
50	Dec. 5, '85	"	—æt. 18			Cure	Loc. cit.
51	'82	Thornton	Female æt. 41	A single cyst so large as to displace the gall bladder into the right iliac fossa hydatids filling the abdomen and protruding under Poupert's ligament into Scarpa's triangle.	Cyst evacuated and cavity sponged out with pure tincture of iodine.	Cure	Brit. Med. Jour., ii, '86, p. 902.
52	'83	"	Female		Opened and drained. Recurrence and spontaneous evacuation.	Cure	Loc. cit.
53	Feb. 14, '86	Marsh	Male, æt 11-2	Had been aspirated twice. In course of the case hydatid swellings detected in different parts of the body were aspirated.	Incision in left hypochondrium; 36 oz. evacuated.	Cure; fistula reopened but the discharge was diminishing.	Brit. Med. Jour., ii, '86, p. 905.

The following case, operated upon by Poulet, is a good illustration of the best modern practice in these operations: In an adult male of robust constitution, with due antiseptic precautions, an incision 10 cm. long was made parallel to the border of the false ribs, over the most prominent part of the tumor. After the muscles and aponeuroses had been divided and hæmorrhage controlled by hæmostatic forceps, the parietal peritoneum was divided and the edges sutured by catgut to the lips of the external wound. Three-fourths of a litre of limpid fluid was then aspirated from the cyst, and as its distention diminished, the wall was drawn out with forceps and a suture passed through the abdominal and the cyst walls at each angle of the wound. The cyst was then opened, evacuated, a portion of its anterior wall excised, the edges of the cyst-wound sutured to the external opening, two drainage tubes inserted into the cavity, which had a capacity of two litres, and antiseptic dressings applied. The sac came away twelve days later and the case passed on to a good recovery completed in fifty days, with some weakness of the abdominal wall.

Poulet considers the indications for active treatment to be subject to the nature of the fluid, the size of the cyst, its seat and its connections with the neighboring viscera. (1) The treatment appropriate for a suppurating cyst is that suitable for an abscess of the liver, incision and evacuation. (2) While the existence of a large cyst, filling up the abdomen and crowding up the diaphragm and neighboring viscera would undoubtedly be an indication for operation, the small size of a cyst would not necessarily constitute a contraindication. (3) Of greater importance is the situation of the cyst with regard to the liver, and the cases may be grouped in four classes (*a*) Cysts of the inferior face of the liver, more or less pedunculated and extending usually toward the lower part of the abdomen; (*b*) Intra-hepatic cysts adjacent to the anterior face and the left lobe; (*c*) Central intra-hepatic cysts; (*d*) Postero-superior cysts; (*e*) Complicated cysts—communicating with the pleura or the bronchi.

The advantage of laparotomy in the first two classes is evident. The question of propriety of operation in deep intra-hepatic cysts, which, while augmenting the size of the liver, do not project at any point, is



more doubtful; although simple aseptic wounds of the liver have not the traditional gravity attributed to them, and the indurated tissue about a cyst is less subject to hæmorrhage than the normal tissue, the conditions are such as to demand exceptional skill and unceasing caution, and a number of cases is required before the question of operation can be settled. Cysts of the upper and posterior portion of the liver had been considered inaccessible, but Israel and Genzmer have reached such tumors by resection of the ribs at the back of the thorax, and the operation must be considered as justifiable, although only with the greatest precautions and in the hands of the surgeon of great skill and long experience. Complicated cysts open up special indications with each case; if a hepatic cyst continues to increase after a rupture and forms a prominence between the ribs and the umbilicus, laparotomy, evacuation and drainage would unquestionably be indicated.

SIMPLE CYSTS.—The liver, in common with other abdominal viscera, is subject to the development of simple cysts. These are subject to the same operative methods as hydatid cysts or hepatic abscess. When presenting no inconvenience from rapid growth or large size, they may be left to themselves. Tait tabulates two successful cases of hepatotomy for the relief of such formations.<sup>1</sup> Morris<sup>2</sup> notes a case of multiple dermoid cyst attached to the surface of the liver, observed by Hulke.

WOUNDS OF THE LIVER.—In the discussion on the surgical treatment of diseases of the liver at the meeting of the British Medical Association already referred to, Thornton<sup>2</sup> related a case where, in connection with an ovariectomy, he made a deep tear of the liver, from which a very alarming hæmorrhage proceeded; this stopped immediately upon the edges of the tear being brought together and maintained in position by a pair of broad-bladed polypus forceps. The patient eventually dying and affording an opportunity of examining the liver, it was found that no oozing had taken place after the abdomen was closed and that the rent was entirely closed by recently<sup>1</sup> deposited

<sup>1</sup> On the surgical treatment of diseases of the liver. By Lawson Tait. *Brit. Med. Jour.* vol. ii. 1886. p. 907

<sup>2</sup> *Loc. cit.*

lymph; from which he concluded that, if a deep rent in the substance of the liver would heal in a patient dying during its healing, we had not much to fear from wounding the liver substance, and might deal with it on ordinary surgical principles, so long as we avoid the large vessels. In the practice of abdominal surgery, it has not infrequently happened that the surgeon has accidentally wounded the liver, and these wounds have usually healed satisfactorily under suitable treatment. Otis<sup>1</sup> collected twenty-six authentic cases of recovery from punctured and incised wounds of the liver, all of which occurred before the day of antiseptic surgery, and without operative assistance applied directly to the gland. According to Ewart,<sup>2</sup> there is a preparation in the Medical Hospital of Calcutta of a piece of liver of the size of the hand, which had protruded through a gunshot wound and been sliced off, the patient ultimately recovering. A natural deduction from these facts would be that moderate incised wounds could easily be controlled by direct surgical action, where possible drawing the lips of the wound carefully together.

The latter surgeon also knew a gentleman, who had a bullet wound right through his liver, losing a large quantity of blood, but he recovered and was in good health. In this connection, Smart's case of bullet-wound of the right lobe of the liver teaches an important lesson. A pistol ball, weighing eighty grains, entered the liver obliquely and was buried in the hepatic substance about a half an inch below the surface, its position being shown by a little elevation. Incision, removal, suture and antiseptic dressing were rewarded by the patient's emerging from a state of utter collapse and by his ultimate perfect recovery. In addition to the cases occurring during the War of the Rebellion, Otis<sup>3</sup> has collected sixty instances of recovery from gunshot wounds of the liver; of fifty-nine cases, occurring during the war, of uncomplicated shot-wounds of the liver—the injury not being associated with fractures of the ribs or of the vertebral apophyses or with lesion of the lung, diaphragm, stomach, hepatic ducts or gall bladder, the spleen, pancreas, kidneys or blood vessels—twenty-five recovered; thirty-seven

<sup>1</sup> Med. and Surg. History of the War of the Rebellion. Part II. Surgical volume. By George A. Otis. Page 130.

<sup>2</sup> Remarks by J. Ewart (Brighton). *Brit. Med. Jour.*, vol. ii, 1886, p. 909.

<sup>3</sup> *Loc. cit.* p., 140.

patients recovered from shot-wounds believed to involve the liver, complicated by various other grave injuries either of the abdomen or of other regions. It should be recalled that these results were obtained without antiseptics and in the great majority, if not all, of the cases without operative intervention, merely through the efforts of nature. It can hardly be doubted that greater boldness and readiness to resort to exploratory laparotomy in case of wounds of the abdomen, with prompt surgical action in case of wounds of the liver—and other solid viscera as well—will be recompensed by a greatly diminished mortality in these cases.

**RUPTURE OF THE LIVER.**—This lesion is quite generally accompanied by other injuries so severe as to render any surgical interference useless. When not fatal by its complications, the depth and extent of the injury and the large vessels torn are likely to impose a mortal termination. However, the facility with which hæmorrhage from a wound of the liver can be stopped by bringing the faces of the wound together, and the readiness with which such wounds heal, even when comparatively extensive, would seem to justify exploratory laparotomy in cases where the symptoms appear to indicate such an injury, and antiseptic suture of the wound.

**HEPATIC PHLEBOTOMY.**—Reflecting upon the futility of leeching and cupping of the abdominal parietes in engorgement of the liver, because of the absence of immediate anatomical connection between the circulation of the two parts, and upon the impunity with which, in certain experiments upon animals, small quantities of blood could be drawn from the livers of living animals with a trocar—autopsy a few days later showing that no blood had apparently escaped from the liver wound and even the wound in the capsule in many cases being detectable only as a small circular ecchymosed spot, without so much as an inflamed area surrounding it—Harley<sup>1</sup> conceived of the operation of hepatic phlebotomy in cases of severe hepatitis. Any risk of air entering a vein during the operation is avoided by inserting the trocar into the upper and convex part of the liver where no large veins

<sup>1</sup>Remarks on hepatic phlebotomy. By George Harley. *Brit. Med. Jour.* vol. ii, 1886, page 899.

whatever exist; and even should there chance to be, on account of some abnormality in the distribution of the vessels, one or two in this portion of the organ, it is a most unlikely thing that a canula of the size of between a No. 2 and a No. 3 English catheter would encounter one of sufficient calibre to admit of the accidental lodgment of the free extremity of the trocar within the vessel so as to permit the entrance into it of air. Even with the enlargement of the vessels of an engorged liver, it is difficult to imagine a large enough vein to admit a 2 or 3 English catheter, in the upper and convex portion of the liver, seeing that no large hepatic vessels, either veins or arteries, are normally to be encountered except in the neighborhood of the portal fissure. It should also be remembered that the entrance of air is a source of danger only in the case of the hepatic vein, for it alone could by any possibility allow sufficient air to cause death to arrive at the heart in an undivided state. The necessity of its traversing the minute capillaries of the liver, where it would become so diffused as to be rendered harmless before reaching the heart, would permit the entrance of air into the arterial or portal venous circulation with comparative impunity.

The operation was tested in the case of a woman of intemperate habits, æt. 38, who had been attacked a month before with hepatitis; the lower part of the body was anasaruous and the abdomen filled with fluid, which had rapidly reappeared after tapping. Other treatment having been unavailing, as a forlorn hope, hepatic phlebotomy was performed. The patient being anæsthetized, a trocar between a No. 2 and 3 English catheter in diameter and 8 inches long, was thrust up to its hilt in the upper part of the liver, from right to left; this was done in the hope that during its transverse penetration of the organ, it might wound one or more vessels—arteries or veins, it did not matter which—of sufficient calibre to yield a free stream of blood. On withdrawing the canula an inch or two, so as to permit the blood oozing from the wounded vessels, to enter the canula from the canal left in the liver tissue by the receding instrument, a full stream of blood immediately issued from its free orifice. Twenty ounces of hepatic blood was abstracted in this way with the result that from that

very day the liver became reduced in size and, with appropriate treatment for the ascites and general anasarca, a cure was rapidly obtained. After the canula were withdrawn a 2-inch square piece of sticking plaster was applied over the abdominal puncture and the abdomen tightly bandaged to bring the abdominal wall into close contact with the wound in the capsule of Glisson, so as to avoid all possibility of hæmorrhage into the peritoneal cavity, in case the natural resilience of the hepatic tissue should not suffice to close the opening—a thing very unlikely to occur unless the operation was bunglingly performed and some large vessel wounded because the trocar had not been properly inserted.

PUNCTURE OF GLISSON'S CAPSULE FOR CHRONIC CONGESTIVE HYPERTROPHY OF THE LIVER.—The facts that simple puncture of the liver for the diagnosis of hepatic abscess, even where no pus is found, often renders the patient more comfortable, that the liver tissues are confined by a strong, inelastic fibrous capsule by which the recently inflamed and still congested tissues are compressed in cases of chronic congestive hypertrophy, and that immediate relief often follows puncture of other equally unyielding fibrous coverings when their contents are in a state of acute or subacute inflammation, as in orchitis, acute sciatica or paronychia, suggested to Harley<sup>1</sup> the propriety of puncturing the capsule of Glisson in these cases.

This practice has met with marked success. With ordinary trocars, varying in size from a No. 2 to a No. 6 English catheter, he makes, according to the strength of the patient and the gravity of the symptoms, from three to six punctures in the right or left lobe of the liver, according to which is the most gravely affected; he withdraws the trocars, leaving the canula in place for a minute or two, to admit of the oozing away of any liquid that may chance to be present at the seat of puncture. No anæsthetic is necessary nor any other precaution beyond employing clean instruments lubricated with carbolized oil. When the operation is completed he covers the seat of each puncture with a separate piece of diachylon plaster, two inches square,

<sup>1</sup>Puncturing the liver's capsule as a remedial measure in cases of chronic congestive hypertrophy. By George Harley. *Brit. Med. Jour.* vol. ii., 1886, p. 900,

and secures them from being rubbed off and, as well, keeps the abdominal wall close against the liver by putting a few turns of bandage about the abdomen, and instructs the patient to remain in bed for twelve hours and to abstain from stimulants for twenty-four hours. Dr. Harley accompanies his description of this procedure by a report of two exceedingly severe and unfavorable cases, in one of which marked amelioration followed and in the other a cure was obtained by its application.

GALL STONES IN THE LIVER.—A case reported by Thornton<sup>1</sup> is worthy of preservation because of its exceptional character and the operation by which it was relieved. The patient was a delicate woman of 57, bearing in the situation of the gall-bladder, a swelling as large as a good sized pear, very tender and very mobile; at its lower border some hard square bodies could be felt, which, with a history of gall-stone colic extending over many years, rendered the diagnosis free from difficulty and, as the patient's health was failing, operation was advised. An incision over the tumour, however, showed that it was not the gall-bladder but liver tissue, through which the stones could easily be felt moving on one another; behind the mass could be found a small atrophied gall-bladder and in the common duct a large stone. The swelling having been packed around with carbolized sponges, and aspiration having produced only a few drops of bloody serum, an incision about an inch long into the most prominent part of the tumor through about a half an inch in depth of liver-tissue came upon a very tightly packed mass of gall-stones. The hæmorrhage was very free but soon ceased with sponge pressure. The upper layer of stones was very small, and as these were cleared away, stones with facets were found; it was necessary to use various instruments to remove them—directors, lithotomy scoops and different forceps—until at last the cavity was clear; then the operator, passing his in, found the large stone which he had felt in the common duct, firmly wedged, and had to break it up with lion forceps and remove it in pieces; there was a long chain of single, bigger stones leading down to this impacted one; the bile must have constantly filtered past this

<sup>1</sup> *Loc. cit.*



stone, as the patient never had any jaundice and, while the stones in the cavity were almost like mother of pearl, the large one and those immediately above it were deeply bile-stained. There were in all 412 stones. The edges of the liver wound were sutured to those of the parietes, the cavity sponged out, and drainage provided, with rapid and complete recovery. The pathology of the case is puzzling; it is possible that the stones originally formed in the gall-bladder and that, its posterior surface becoming thinned and atrophied by pressure, they gradually made their way into the substance of the liver, destroying the wall of the gall-bladder at the point of exit; there was, however, nothing in the history of the case to mark a severe lesion of this kind, and the gall-bladder, although atrophic and empty, appeared to be perfect. It is more probable that the large stone originally formed in the gall-bladder and then became impacted in the common duct so as to abrogate the function of the gall-bladder, and that the other stones were formed in the hepatic duct and above it in the substance of the liver, where they gradually hollowed out the cavity from which they were removed—and this is the opinion of the operator.

CHOLECYSTOTOMY.—Incision of the gall-bladder is so firmly established as a surgical procedure as to need no argument in its support. The papers of Bernays, Boeckel, Fuhr, Keen, Landerer, Lange, Parkes, Robson, Tait, Thiriar and Wesener, contributing to this end, have been presented in abstract in the ANNALS OF SURGERY as they have appeared. The papers presented at the meeting of the British Medical Association, to which reference has already been made, confirm fully the propriety of the operation. Lawson Tait<sup>1</sup> presented twenty-nine consecutive cases, of which twenty-eight were successful, demonstrating conclusively that the operation, when properly performed, is as devoid of risk as any surgical procedure possibly can be, having in this respect an advantage over all other procedures for the treatment of gall-stones, because in none of them has anything but a heavy mortality been obtained. Tait considered that diagnosis is also, in his hands at least, approaching a greater degree of certainty, for, in but

<sup>1</sup>The surgical treatment of diseases of the liver. By Lawson Tait. *Brit. Med. Jour.*, vol. ii., p. 906.

three cases had he made a mistake in diagnosis, distention of the gall-bladder existing in two of the cases, due in one of them to a bit of cancer obstructing the common duct, while the third was a case of cholæmia in which no stone was found, but the operation cured the patient. Mr. Tait's method of operating has already been described in this journal (vol. iii, p. 397).

As a result of the examination of his cases of gall stones, he concludes that persistent intense jaundice is not only not a symptom of gall-stones, but is a symptom which might make us hesitate to advise operation even in cases where we feel pretty sure that the gall-stones enter into the case; for it was observed that those cases in which cancer of the liver occurred as a complication, jaundice was a constant symptom.

He believes that the definition of the success of all abdominal operations should be divided into primary and secondary, the former referring to the operation alone while the latter refers to the effect upon the trouble for which it is performed.

Thornton<sup>1</sup> refers to a case in which, after diagnosis of gall-stones, the abdomen was opened and about the gall-bladder many dense adhesions, but no calculi in the gall-bladder were found. There was a strong band across the end of the gall-bladder, and the question arose whether it might not be the cause of the colic by preventing proper contraction, and whether it should be divided. The risk of doing more harm than good with structures of this kind deep in the cavity and to be dealt with only by touch determined the surgeon to leave it alone; he however freely divided the suspensory ligament and separated the adherent omentum from the ligament, liver and parietes. The patient made an excellent recovery and had no return of the colic.

ARTIFICIAL BILIARY FISTULA.—Willett<sup>2</sup> reports a case of obstruction of bile for which exploratory incision was performed and complete occlusion of the common bile-duct, probably due to chronic inflammatory changes leading to a gradual but complete stenosis, being found, an

<sup>1</sup>*Loc cit.*

<sup>2</sup>Complete obstruction of the common bile-duct; cholecystotomy; biliary fistula marked improvement. By Alfred Willett. *Brit. Med. Jour.*, vol. ii, 1886, p. 903.

external fistula was made. The patient's sufferings were completely relieved, her jaundice very markedly diminished and her health greatly improved as she remained in the hospital, but she died not many months after, it was said, exhausted by sores produced from the discharge.

If obliteration of the duct could have been foretold, aspiration of the gall-bladder and an occasional repetition of it would probably have given the same relief to the patient as the operation, without the association of a continual irritating discharge. And he considers it a point for discussion as to whether cutting into and draining the gall-bladder should be undertaken before aspiration has been fairly tried, having also in view the additional information which the point of the needle might acquire, when the obstruction is due to gall-stones.

In cases similar to this, it would be advisable, says Mr. Willett, to render the cholecystotomy a complete operation, forming an artificial channel between the gall-bladder and the intestine, at a point where they lie in close proximity, in order that the biliary secretion should be discharged, after the normal arrangement, into the bowel rather than drain away externally. One of two points must be chosen: (1) at or about the junction of the first and second part of the duodenum, and (2) where the ascending colon curves and becomes transverse, these being the points where naturally produced entero-biliary fistulæ are almost invariably found to have occurred. The selection of the former would be based on physiological reasons and that of the latter upon mechanical reasons, because of its close relations to the gall-bladder here. The writer would unhesitatingly choose the latter, chiefly for two reasons: (*a*) the operation of forming a communication between the gall-bladder and the duodenum would be much more difficult in all cases, perhaps impracticable in some on account of the restricted space at command, the depth at which this part of the duodenum lies and the nature of the structures—referring to the liver in particular—which cover or surround it, while the gall-bladder and colon lie side by side almost in the line of the incision; (*b*) the presumed physiological claims are much less valid than appear at first sight, for microscopic examination of the liver in cases of long standing obstruction shows an

advanced atrophy of the bile-secreting cells; moreover the fluid found in the dropsical gall-bladder is some evidence of this change, being of very low grade, scarcely more than limpid mucus. There is no proof of a possible argument that, were the flow of bile into the intestine re-established, functional activity would again take place in the liver cells. An objection may be raised against establishing direct communication between the gall-bladder and colon, that the fæces now contain putrefactive germs which would probably find their way into the gall-bladder and along the hepatic duct, and excite supuration in the liver; that this is not necessarily so is shown by a case recorded in the Transactions of the London Pathological Society where, in a woman who died of uterine cancer and in whom during life no suspicion existed of there being anything wrong with the biliary organs, there was found a large patulous aperture between the colon and gall-bladder, completely shrunken, this last circumstance proving its long duration. In making the communication, the artificial aperture should be of a slit-like nature rather than a patulous hole, and the incision in the gall-bladder should be made at its lower rather than its upper part, in the expectation that, with the shrinking of this viscus, a tube-like track would be formed with a valvular termination.

MENTAL EFFECT OF LAPAROTOMY IN CURING DISEASE.—Tait<sup>1</sup> has observed in connection with hepatic troubles a fact noted by Thomas in connection with diagnostical laparotomy—improvement resulting from a simple opening of the peritoneal cavity without other operative action. He records two cases, in one of which he found the liver covered with small seed-like bodies, which he regarded as miliary abscesses; this case recovered the best of health immediately after the operation. The second was a case where the chief symptom was intense hepatic pain; laparotomy revealed only some adhesions between the edge of the liver and the parietal peritoneum; these were separated and the abdomen closed, resulting in relief to the symptoms, which, however, returned later.

JAMES E. PILCHF

<sup>1</sup>*Loc cit.* Page 105.

THE DISCUSSION ON THE SURGERY OF THE LIVER AT THE  
1886 MEETING OF THE BRITISH MEDICAL ASSOCIATION.

At a time when many are regretting the steady rise of "specialties," and are lamenting over the narrowness of view which this concentration of study is liable to produce, we may take comfort to ourselves by the thought that, after all, things are working out their own cure. So long as the functions of nearly every organ in the body are but imperfectly known and the effects of disorder of these functions are proportionately obscure, so long may the main energy and intellect of individuals be focused on particular subjects. But every treasure of fact and truth laboriously dug out of the dark unknown by any one man, becomes now the common property of all who care to use it, and may be made a stepping stone for fresh advances in many remote branches of enquiry. We are, therefore, only passing through the chaos stage which leads to a higher order, for the more thoroughly that individual portions of physiology, pathology, or therapeutics, are worked out and understood, the more certainly does this knowledge throw light on all other parts as well, while it also reveals or establishes general principles which are true of all. That which is the peculiar property of the special enquirer to-day will be in common use by the general practitioner tomorrow. At the meeting of the British Medical Association held at Brighton last year an example of this tendency of specialization towards the simplification of knowledge might have been taken from the contribution to the discussion upon hepatic surgery. A physician who has made liver diseases a specialty, two surgeons operating almost entirely upon abdominal cases, one with extensive experience in the surgical diseases of children, and a general surgeon in a large hospital, met together, to compare their views and experience in the surgical treatment of an organ which a few years ago might have been considered outside the range of surgery altogether. The result may be taken in a word to be that certain diseases of the liver are more than ever brought within the pale of ordinary surgical treatment.

Dr. Harley dismissed the practice of leeching over inflamed liver

for want of a vascular connection, but he asserted that with a (large and long) trochar and canula the liver substance might be punctured without risk, and blood drawn off from the congested vessels themselves. Although he made a distinction between this operation when done for acute hepatitis ("hepatotomy") and when for "chronic congestive hypertrophy" ("hepatic capsule-puncture"), the process seems to be much the same in both classes of cases. In the first, blood is withdrawn by a single puncture; in the second, several punctures are made and any liquid that will come is allowed to ooze away. Probably also the therapeutic effect is similar, although the stage of the inflammation is somewhat different.

The results stated in the paper quite justify the method of procedure adopted, but the reasons given for it are not always so conclusive. For instance, it is said that considering the intemperate habits and lowered constitutions of the usual subjects of dangerously acute hepatitis, it would be unwise to abstract blood sufficient in amount to affect the general circulation, and yet in the one case referred to, although the woman was of intemperate habits and so ill as to be in a helpless condition, even in her husband's eyes, "twenty ounces of hepatic blood were abstracted without the slightest deleterious result." Again the expression "puncture of the liver's capsule" is somewhat misleading when the liver substance is also deeply penetrated, and when experiments seems to show that no oozing occurs after the trochar and canula have been withdrawn. Unless the process were similar in the acute as well as in the chronic cases, it would be difficult to understand the reason for the analogy selected between puncture of the capsule of the liver in chronic congestive hypertrophy, and the similar procedure in acute orchitis, acute sciatica and painful whitlow. On the other hand, while the argument is clear for rejecting local blood-letting by means of leeches applied to the skin over the liver, still it is impossible to deny that this treatment has often given relief. One of the speakers at the subsequent discussion, Dr. Cullimore, had himself suffered from acute hepatitis on two occasions, and "well remembered the relief he had experienced from the use of leeches." Whether this was from their local or general effect we have



not evidence to say, but even though direct vascular connection could not account for benefit, still we are at least not able to exclude the possibilities of reflex nervous or vaso-motor influences which might have been set at work.

Apart from these vexed question, however, Dr. Harley, in his able and suggestive paper, has established what was known to comparatively few before—in this country at least—that the liver substance when congested can be freely punctured without risk, and blood and serum withdrawn with good hopes of benefit. This helps to remove the previous dread of interfering with the liver, and confirms the belief in abstracting blood from the vessels of an inflamed organ or area. Possibly the recognized advantage of compressure under such circumstances may receive support from the benefit which followed the application of a firm bandage over the region of the liver, although the object was a different one, *i. e.* prevention of oozing from the seats of puncture.

From Mr. Knowsley Thornton's experience we learn that the smart hæmorrhage which followed an accidental rupture of the liver substance was easily stopped by direct pressure, and did not tend to return, and that when an incision was made through half-an-inch thickness of liver substance "the hæmorrhage was very free, but soon ceased with sponge pressure." It may be remarked in passing, that Mr. Victor Horsley has lately drawn attention to a like behaviour of the brain cortex with respect to hæmorrhage, while he has likened that in turn to what is already known of the kidney.

In one of his cases Mr. Thornton noticed "that when the wound "was nearly closed, the liver being still exposed, where the tube had been, it was found to be exceedingly sensitive: much more so than the skin edges close by, which were a little red and sore."

Three cases of successful treatment of liver abscesses are given, one in a child, by a single tapping, another, also, by Mr. Thornton by incision and drainage through the pleural cavity, and another by Mr. Howard Marsh through the abdominal wall. In all of these antiseptic precautions were efficiently carried out, and there can be little doubt that it is to these that the successful issue is mainly due. Former ex-

perience, where no such precautions were taken, gave extremely bad results. As yet sufficiently wide experience with reliable antiseptic precautions has not been obtained to justify any definite conclusions, although the results in other forms of abscess are sufficiently well known. Mr. Thornton dissected up the pleura and reunited it to make a separate compartment for the drainage tube as it passed through the pleura in one of his cases. In the *ANNALS OF SURGERY* for October, 1886, an abstract of Dr. Kartullis' paper is given, in which he narrates two successful cases of liver abscess treated by resecting portions of ribs, but without any attempt to shut off the pleural cavity from the drainage tube. The old plan of trying to cause an adhesion between the liver and the abdominal wall before attacking an abscess or cyst in the former, has now been quite superceded by free incision and antiseptic precautions. Preliminary aspiration after the parts have been exposed is an important means for lessening the risk of escape into the abdominal cavity. After opening and emptying the abscess, the aperture in the liver or gall bladder is to be sewn to the abdominal wound, and a drainage tube left in. Antiseptic dressings are applied until the discharge ceases and the fistulous opening closes.

It is not more than might have been expected to find that hydatid cysts were treated successfully by free incision and evacuation under antiseptic precautions. In one of Mr. Thornton's cases, after the cyst was emptied its walls were sponged with iodine and the aperture closed by the same stitches which closed the abdominal wound. There was no return. In other cases continued drainage was established, while in others (Mr. Marsh's case) aspiration was sufficient. One death is recorded where previous aspiration had permitted septic changes to begin, and where incision and evacuation came too late. These results only bring hydatid cysts of the liver under a treatment which has been found of service in other kinds of cyst elsewhere in the body.

So far as the diagnosis and treatment of gall stones and hepatic calculi is concerned, while nothing was added by the discussion to this new department of surgical knowledge, still recent views were confirmed. In Mr. Thornton's case of gall stones within the liver

successfully treated by incision and drainage, there had probably been originally an obstruction of the common duct by a calculus which had first formed in the gall bladder. Mr. Thiriar in the *Rev. de Chir.* Mar. '86 (v. ANNALS OF SURGERY, October, 1886) points out the close, perhaps inseparable, connection between obstruction of the liver ducts and formation of hepatic calculi, owing to the necessity for inspissation of bile before deposit can take place.

In Mr. Willet's case of obstructive jaundice from blocking of the common bile duct great relief was given by the formation of a fistulous opening. It is of interest to note that the subsequent death, several months afterwards, was attributed to exhaustion resulting from sores produced upon the skin by the bile as it escaped, not from the effects of the loss of bile from the system. After the bile was allowed to escape externally not only did the colour of the patient's skin and conjunctiva improve, but she gained flesh and improved in spirits. Her motions remained colourless, of course, but they were regular and "large-formed." In such cases, where the common duct is quite impermeable, Mr. Willet raises the question of establishing an entero-biliary fistula. He prefers the colon, where the ascending and transverse parts meet, to the duodenum at the junction of the first and second parts, as the site for this fistulous opening, mainly on account of the ease in reaching the spot, but also because the supposed physiological advantage of the duodenal site is lessened by the impaired character of the bile in such cases, owing to the disease of the liver which prolonged obstruction of the ducts has been found to produce.

Several interesting questions raised by the blocking of the various ducts connected with the liver and gall bladder may be briefly noticed here. What, for instance, is the effect of disuse of the gall bladder from obstruction of the cystic duct? Clinical evidence points to the comparative uselessness of the gall bladder, for patients seem to do wonderfully well without it. Either a constant flow takes place into the duodenum, of bile which is rapidly passed downwards and re absorbed, or the hepatic ducts dilate in the intervals of digestion and act as reservoirs until the stimulus of chyme causes a reflex contraction and discharge of contents into the duodenum. Which of the

two it does not very much matter so long as we may be fairly confident that the patient's life is not endangered or his health seriously impaired. It is not very uncommon to find in the post-mortem theatre a gall bladder so full of calculi as to have been practically useless as a reservoir and yet during life, except for the passage of gall stones, these patients seem to have had no symptoms by which the conditions might have been suspected. Mr. Thiriar reports that two patients whose gall bladders he had incised were in excellent health three years after the operation. (*Rev. de Chirurgie* v. ANNALS OF SURGERY, Vol. IV., No. 4, p. 339). Again, Mr. Mayo Robson in the *Lancet*. 1885. Vol. II., p. 806, reported two cases of recovery and subsequent good health where there seemed to be a permanent obstruction of the cystic duct, leading to that distention of the gall bladder which had necessitated the operation of cholecystotomy. In addition, physiologists have remarked that the bile found in the gall bladder is so concentrated, as compared with what flows from the hepatic duct, that it must have lain there for some time. From this they argue that the gall-bladder can hardly have the reservoir function for constant storage and discharge which has usually been assigned to it. Putting all these arguments together we may conclude that no very serious results will follow if the gall-bladder be removed, or its cystic duct obstructed, and so other things being equal, the surgeon may deal with it as he pleases without much fear that it will be missed.

On the other hand, when the common bile duct is obstructed and an external fistula has been established, no bile enters the alimentary canal, as it is discharged and lost to the system. The effects of this condition confirm the view which is gaining ground among physiologists that the bile is more an excretion than a secretion. Hence the extremely serious results of its return to the blood by the lymphatics of the liver when there is complete obstruction, hence also the comparatively slight effects of its non-discharge into the duodenum. The food is not so well digested, nor so efficiently absorbed, and the fæces are more apt to decompose—but in spite of this a patient rapidly sinking under complete obstruction to the bile, seems to regain flesh and

spirits when all the bile is allowed to escape. There remains then the risk of irritation by the action of bile on the skin at the wound—this will have to be faced, but might surely be much lessened by the use of unguents on the skin and of absorbent dressings.

One other point of considerable interest and importance is the effect which adhesions to surrounding parts produce upon the liver. Apparently the liver must require free scope to move with the diaphragm, and perhaps also to alter its size with the flow of blood through it, for adhesions set up the most violent symptoms, like those of gall-stones, and division of adhesions causes these symptoms at once to subside. Mr. Knowsley Thornton's case of permanent and Mr. Lawson Tait's case of temporary relief of urgent symptoms by the division of adhesions only, seem to admit of scarcely any other explanations. Possibly in the latter case adhesions had formed again and so the symptoms came back. At least the relief of symptoms in these two cases will furnish still another inducement to surgeons to open the abdomen in serious and obscure cases with an increased prospect of doing good.

Mr. Lawson Tait has published the details of several more cases and has added a tabular view of his results under the three heads of (1) Seven cases of exploratory incision—five being for cancer and ultimately fatal. (2) Thirteen cases of hepatotomy—chiefly for hydatids and gall-stones—and all primarily and secondarily successful. (3) Thirty cases of cholecystotomy with good results except where there was cancer. An important factor in the prognosis of liver cases is held by Mr. Tait to be the presence of jaundice—as he puts it, “but this stands out in my experience with perfect certainty, that in not one of the uncomplicated cases of gall-stone upon which I have operated, and when the secondary result has been as successful as the primary, has jaundice been at all a symptom noted in the case. On the other hand in the one fatal case in my list and in three others in which the secondary results have been unsatisfactory, jaundice has not only been a marked, but it has been the principal symptom.” So strongly does he hold this that he considers jaundice a contra-indication for operation for gall-stones when every thing else might seem to demand it.

Doubtless further experience and research will still further open up the field of hepatic surgery, but it is impossible to doubt that already the ground is well broken up.

CHARLES W. CATHCART.

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RESULTS OF SOCIN'S OPERATIONS FOR THE RADICAL CURE  
OF HERNIA AT THE BAËLE CLINIC.

The *Deutsche Zeitschrift für Chirurgie* for August, 1886 (Bd. xxiv. Hft. 3 and 4) contains a lengthy communication, occupying one hundred and eighteen pages of the journal, from the pen of Johannes Anderegg, of Glarus, Switzerland, which is devoted to a clinical study of the cases of hernia treated by radical operation at the surgical clinic at Bâle, and contains besides the author's original remarks, full statistical data of the material considered, and concise abstracts of the whole number of cases reported upon—one hundred and twenty-eight in all.

The young author had prepared the paper as a thesis for obtaining his diploma ("Inaugural Dissertation") but succumbed to an attack of acute pneumonia, before it could be printed.

The paper is therefore edited by Professor Socin, of Bâle, who, however, has refrained, under the circumstances, from making such corrections and additions, as he would otherwise have suggested to the author.

The object of the paper is to contribute towards the solution of the question as to the real value of the radical cure of hernia by operation; and the results at which the author arrives are contained in eleven paragraphs submitted for discussion, which we give below:—

Some of the cases considered were published by Professor Socin at the Eighth Congress of German Surgeons in 1879; and since then three separate dissertations based upon cases treated at the Bâle surgical clinic have been written, prior to the year 1881, all of which are taken note of in the present paper.

The subject matter embraces one hundred and thirty-six operations in all, which were performed upon one hundred and twenty-eight patients. In fifty-six cases non-incarcerated herniæ were operated upon,



while the operation was performed seventy-one times for incarceration. In nine cases of incarcerated intestine, in which herniotomy was performed, the radical operation was, however, contraindicated ; and these latter cases are only considered in regard to the question of mortality after herniotomy.

Generally speaking, the method of operation was as follows, antiseptic precautions being observed throughout :—

The sac was dissected out, either before or after it had been incised, and was then ligated as high up as possible, either by means of a single ligature or doubly after transfixion of the pedicle with a suture. The rest of the sac was then cut away, and the pedicle returned to the abdominal cavity. In two cases the ligatures slipped off the pedicle, in the moment that it was being returned, and could not again be replaced ; no peritonitis ensued, however. Catgut was used in all but eleven cases, where silk was preferred. The opening of the inguinal canal was sutured in forty-four cases (of 89) of inguinal hernia. Thorough disinfection of the parts was carried out before replacing them in the abdomen.

A great number of statistical figures are given in regard to the different points of interest concerning the operative treatment, many of which are of special value.

Thus in six per cent. of the cases the intestine was found to be adherent to the sac.

The mortality for the radical operation performed for non-incarcerated intestine was found to be 3.6 per cent. Two cases out of fifty six died from the direct effects of the operation, one of sepsis and hæmorrhage from the pedicle, the other of gangrene of the integument. Of forty-four cases of excision of omentum one died from secondary hæmorrhage.

Comparing these figures with the results of other statistical publications the author finds the mortality percentage for two hundred and seventy-three operations to be 5.1. The mortality percentage, if calculated for different ages, amounts to 8.3 for patients under ten (24 cases); to 1.6 between the ages of 11 and 40 years (125 cases) and to 8.1 for patients over 41 and under 76 (111 cases). The latter figure 8.1 is still increased by intercurrent affections.

The age between 11 and 30 years is the most favorable for operation; only one death having occurred in seventy-five cases from secondary hæmorrhage from the exsected omentum; so that the mortality percentage for operative treatment for free hernia without exsection of omentum at this age is 0%.

On the other hand large herniæ show an unfavorable influence on mortality statistics; so that elderly patients with large herniæ, at the operation of which omentum was excised, have a mortality of 40%; young individuals, with small herniæ, without resection of omentum have 0%.

The mortality for simple herniotomy for incarcerated hernia was found to be 24.3 per cent—28 per cent. for the crural and 9.8 per cent. for the inguinal varieties; so that the life of a patient having a crural hernia is fourteen times as much in danger as that of one having an inguinal hernia.

In four cases replacement '*en masse*' had been made, in three of which fatal termination ensued through peritonitis.

The influence of the duration of incarceration before operation was found to increase the mortality percentage from 1.28 to 26.3 after the third day. Incarceration has also a different influence upon the mortality—percentage according to the age of the individual; before the 40th year we have 9.5 per cent.; after that 30.2 per cent.

In six cases where the abdominal cavity had been drained, death resulted in every case. In nine cases the intestine had been sutured; three of these died.

As regards the course of wound-healing of the 114 radical operations performed, 79 healed by primary intention in an average of 15 days; in 35 cases some disturbance occurred, and the average time of recovery was 35 days. Total average time for all cases 22 days. In three cases, namely, suppuration ensued owing to the use of impure catgut. For this reason silk was used in eleven cases, in three of which it caused disturbance, the ligature coming away after 4 and 17 months respectively in two cases, and a fistula remaining in the third case for nine months.

The influence of different features of the cases upon the course of

recovery is also noted ; thus disturbances occurred more frequently and were more severe in character in the treatment of non-incarcerated inguinal hernia in males, than in incarcerated hernia.

This fact, however, must be explained by taking the size of the individual hernia into consideration. On the other hand incarcerated inguinal herniæ in females, as well as all crural herniæ show more disturbances in the course of recovery than do the non-incarcerated ones; in these cases a notable difference in size did not exist.

For the smallest hernia the average time of recovery amounted to twenty-five days, disturbances having occurred to the number of 20 per cent. In scrotal hernia on the contrary disturbances occurred in 69 per cent, of the cases—these being the largest herniæ of all; the longest term of recovery was eighty-four days.

No difference as to size was found in crural hernia in any respect. The age of the individual had no demonstrable influence upon the course of recovery.

The course of wound-healing is primarily influenced, as is to be expected, by the operative treatment. But as the sac was extirpated in each case—the question as to whether this procedure is advisable could not be answered. Suture of the canal, or constricting ring, performed thirty-seven times in seventy-eight cases, appears to have caused disturbances in the wound-healing process; and the author believes this due to the traction occasioned by the sutures.

Suture of the vaginal process above the testicle, in order to close the tunica vaginalis testis propria was always attended by good results. Swelling of the testicle was frequently observed in cases where the sac was adherent and difficult to dissect out, probably owing to some lesion of the spermatic cord. In three of the entire number of cases peritonitic symptoms appeared; in two thrombosis of veins in the lower extremities, and twice decubitus occurred.

In collecting the final results of all the radical operations the author was able to hear from one hundred and five out of the one hundred and fourteen patients. 61 per cent. were found completely cured; but in 39 per cent. of the cases recurrence set in. Three-fourths of the whole number of recurrences were observed within the first year after

operation ; and the probability of a recurrence setting in after the second year was calculated at  $\frac{1}{50}$  per year for each patient.

Herniæ of long standing were found to recur easily and to grow rapidly. The following observations were made relative to the recurrence of hernia treated by radical operation :

As to variety: inguinal h. 41% recurrence. Crural 33%. As to duration of h. before operation: under ten years 28% rec.; over ten 65%; very recent h. 0%. As to size of h.: scrotal h. 78% rec.; non-scrotal 23%. As to the age of the patient at operation: under twenty years 14% recurrence; 21-40 years 49%; 41-60 years 41%; 61-77 years 29%. As to heredity: present 45% rec.; no heredity: 34%.

As to presence of hernia in the same patient on the side not operated upon (individual disposition): present 52% rec.; not present 34%. As to the occupation of the patient after operation: hard work 38% rec.; light work 53% rec. (!). Recurrences when cough was present 47%, with no cough 32%.

As to suture of canal: small hernia, canal sutured 28% rec.; not sutured 27%; large hernia, canal sutured 53%; not sutured 48% rec.

These last figures admit no practical conclusion. The author is in favor of omitting the suture of the canal or ring merely because disturbances occur more frequently after it in the course of wound-healing.

Excision of atrophic testicles gives better results than to allow them to remain. Whether the sac itself is ligated or sutured, does not influence the recurrence of the hernia; but it should be closed at as high a point as possible, the sac being either pulled out as far as possible, or the inguinal canal laid open.

Interesting figures are given in answer to the question whether the use of a truss after operation influences the recurrence of the trouble. If no truss was worn, 27% recurrences ensued; if one was worn part of the time, 44%; and if all the time, 62% recurrences were observed.

In inguinal hernia alone constant wearing of a truss induced 54 per cent. recurrences, while with no truss only 24 per cent. occurred.

Although the author does not attempt to explain these figures fully—he points out that wearing a truss may enlarge the hernial aperture. by pressing the integument in towards the abdominal cavity during the

day in the same manner that the hernia presses it out during the night.

The practical conclusions which the author draws from his investigations are that the radical operation should be performed as early as possible in all cases of hernia. The procedure is contraindicated, however, by a bad general condition of health. Elderly patients as well as children should not be operated upon, or at least, only in case rapid enlargement of the hernia occurs.

Recent inguinal hernia should be operated upon in all cases; crural hernia, however, not without some special indication, as liability to become incarcerated, etc. In the majority of cases resection of the omentum is indicated.

In case of incarceration of a crural hernia, no time should be lost before operating; in incarcerated inguinal hernia, however, taxis may be first attempted. The age of the patient should not be allowed to influence these latter rules.

In case simple herniotomy is to be performed—the radical operation may be combined with it in most all cases.

The theses submitted are as follows:

(1). Permanent cure of herniæ by operation is possible; it is the rule in herniæ of recent date; in those of older date it is the exception; generally speaking cure may be looked for with the more certainty, the more recent and the smaller the rupture is.

(2.) Permanent cure is more probable in individuals who have not completed their growth, than in those who have ceased to grow, other beings being equal.

(3). The prognosis as to the permanency of the cure is unfavorably influenced by the existence of another (double) hernia in the same individual, as well as by the presence of hernia in the nearest relations of the patient.

(4). Habitual bodily labor appears to favor the permanency of the cure. Coughing, on the contrary, tends to cause relapse.

(5). The probability of recurrence constantly decreases from the time of operation, being very slight indeed after lapse of two years.

(6). The risk of life by the radical operation is in great measure dependent upon (1) the age of the patient. (2) The variety and size of the hernia. (3) The necessity of exsecting the omentum.

(7) In youthful and middle-aged individuals enjoying good general health quite recent inguinal hernia specially require operation; radical operation is furthermore indicated in all cases where the existence of the hernia causes any trouble, and the more so, the smaller the rupture, and the younger the individual is. Very large herniæ occurring in old or infirm people are to be considered inoperable.

(8). Herniotomy should be performed without delay in cases of incarcerated crural hernia, as well as in small incarcerated inguinal herniæ. The larger inguinal herniæ are, the more frequently attempts at replacement should be repeated. Radical operation should be performed after herniotomy in every case unless special contraindications are present.

(9). The most favorable method of performing the radical operation is to ligate the sac doubly or repeatedly at as high a point as possible, and excise it. Whether the ligature of the sac in inguinal herniæ is best done after withdrawing the sac out of the inguinal canal, or after incising the canal, cannot as yet be finally decided. Suture of the constricting ring is not advisable.

(10). Adherent or hypertrophic portions of omentum; and such as have undergone textural changes by incarceration, are generally to be excised after application of a ligature *en masse* to the pedicle; the stumps are to be returned to the abdominal cavity.

(11). After operation the wearing of a truss is not permissible, as long as a relapse has not occurred.—*Deutsche Zeitschr. f. Chirg.* Vol. 24. Hft. 3 and 4, August 25, 1886.

W. W. VAN ARSDALE (New York).



## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. Nature, Pathogeny and Treatment of Tetanus.** By M. VASELIN (Angers). At the last meeting of the French Congress of Surgery this was one of the four questions proposed for discussion. Of 17 cases observed by Vaseline, but one had recovered; of 22 cases collected in his neighborhood, but one had been cured; and that one had been treated by large doses of laudanum. There may be different species of tetanus, and he believes that there is one which is but a neurosis, curable by the method which he followed in the case of a child who sustained a fracture of the thigh, and a deep wound of the popliteal region by falling into a machine. The knee was disarticulated and the fracture splinted; the patient was doing as well as could be desired when, after a stormy discussion with a visitor, the first symptoms of tetanus appeared; after 29 days the patient recovered, not only from the tetanus, but from the amputation and fracture. In this case the cause of the tetanus could not have been cold nor any modification of the atmosphere; nor any irregularity nor laceration of the wound; there was no systemic poisoning, for the author injected the blood, sweat and the urine of the patient into animals without any effect. He believes that there was simply a nervous hyper-excitation, caused by the discussion which determined the attack of tetanus. Accordingly, he treated the patient for a neurosis, first isolating him, and then administering chloral in large doses with two days after, in spite of the youth of the patient, injections of morphine until the cessation of the spasms. The patient recovered. When his right hand was severely wounded a year after, the tetanus did not reappear. He concludes that tetanus has a nervous origin, curable by laudanum, chloral and morphine. It is not subject to recurrence.

M. BALESTRI (Gênes) has thought, since 1882, that he has a remedy

for tetanus; he also considers tetanus a neurosis. All medication based on the infectious nature of the disease has failed. The only successful remedies are those employed in nervous diseases. His remedy is tartrate of antimony. He relates two cases treated successfully by this method, in doses of from 5 to 45 centigrammes, rapid recovery ensuing. He had collected 17 cases occurring in the hospital of Gènes. They had been treated by chloral, with 11 deaths; of 3 cases treated with tartar emetic, 3 recovered.

M. THIRIAR (Brussels) had lost 4 ovariectomy patients from tetanus: (1). The first had a small cyst, removed rapidly and easily. On the sixth day the patient was exposed to a draught and caught cold; trismus appeared in the evening. Chloroform was inhaled, so as to maintain a condition of semi-consciousness, but death supervened 36 hours after the beginning of the trouble. (2). The second was a case of oöphorectomy for a hemorrhagic fibroma, the operation lasting 25 minutes. The immediate results were as satisfactory as possible, but six days after the operation, difficulty of deglutition appeared, and on the next, spasm of the extremities with death in the evening. (3). The third was an ovariectomy occupying 20 minutes, including the dressing. Injections of cocaine and morphine produced some relief, but death supervened 18 hours from the beginning of the trouble. (4). The fourth was an ovariectomy occupying 30 minutes, the first symptom appearing on the sixth day. An injection of pilocarpine was given, but death occurred in seven hours. He rejects the nervous theory, every cause of excitement having been excluded in these cases except possibly the cold in the first, and, observing the uniformity of the period of incubation, adopts the theory of contagion. He afterward learned that for two years tetanus had been endemic in the vicinity of the fourth operation. He had collected 8 cases which had occurred in this vicinity during 18 months, where none had been observed for 30 years before. These facts seems to him to singularly favor the parasitic theory of the origin of tetanus.

M. MANOURY (Chartres) did not believe in the contagiousness of tetanus. During 8 years, he had 7 cases, without counting the spontaneous variety or that of the new-born. The first occurred six days

after a compound fracture, death ensuing rapidly. Since that time not a single case of tetanus had developed in the hospital. The second was dead when he saw it. The third developed six days after an ovariectomy, death supervening rapidly. The wound had united, although there were a few drops of blood under the cicatrix. The fourth followed a burn, the patient dying. He lived in a lane where horses never passed. The fifth was a fatal case of tetanus developing after an amputation for crushing of the forearm. The sixth appeared on the ninth day after a herniotomy performed three days after the preceding operation, with death on the next day. This patient lived 12 kilometers from the preceding one, and between the two the operator had performed several important operations without accident. The last case had received a blow on the ear. He died 12 days after. Dogs were inoculated from his cerebellum without results. All these cases occurred in March or April, or in October or November. In none of them had there been any opportunity for contagion. In a large number of cases of tetanus in horses, all were isolated cases, which fact does not seem to him favorable to the theory of contagion of tetanus.

A. VERNEUIL (Paris), after referring to the contradictory theories of the causation of tetanus, compares it to trichinosis, rabies and anthrax, in being derived from animals, and expresses a belief that the horse to which we already owe glanders, gives us also tetanus. At all events, he would advance four theses:

1. Tetanus is a specific infectious malady, the development of which is never spontaneous.

2. Tetanus affects several kinds of animals, but its characters are always identical. If then, the contagiousness of tetanus be proven for one kind of animal, it will be proven for all and in particular for man.

3. Tetanus is transmitted in several ways, but especially by means of traumatism, like to like, or to different kinds.

4. It probably has a microbic origin. Unfortunately, the microbe itself has not yet been isolated.

The pathogenic germ demands for its development a number of circumstances, formerly considered efficient, but which are but incidental. It needs a combination of circumstances, among which traumatism

and probably cold, take the front rank. If it be admitted that tetanus of the horse is infectious, it must be admitted that tetanus of man is the same. Now, the contagiousness of tetanus in the horse is beyond discussion, as is shown by the cases of Larger presented to the Société de Chirurgie a year ago, and by the observations of Cérémini, who states that at Noisy-le-Sec tetanus has been endemic from time immemorial. All horses wounded within a radius of several leagues from it die of tetanus. It has been estimated that  $1\frac{1}{4}\%$  of the horses at Noisy die of tetanus. In a village of Ardennes a veterinarian castrated 13 horses on the same litter, and they all died of tetanus. In a neighboring village he operated upon 10 others, who also died. If tetanus is fatal in the horse, it is the same in man. But it has been said that no man has ever given tetanus to a horse. That proves nothing. We know that when an infectious disease passes from one species to another, it does not necessarily pursue the inverse course. The animal theory of tetanus is based upon four groups of facts :

1. Cases of human tetanus supervening in persons in communication with tetanic horses. Such are the cases of Larger. Such also was the fact in a case of mine where a man died of tetanus after his horse.

2. The particular frequency of tetanus after bites or wounds inflicted by horses.

3. The frequency of tetanus in men who are in habitual relations with horses, such as grooms and stablemen.

4. The appearance of tetanus after wounds which have been in contact with soil contaminated by the dejections of horses.

M. DOYEN (Rheims) had observed 3 cases of tetanus. One appeared after a wound of the hand. At the autopsy red puncta were observed in the gray matter. In the second case there was a myelitis of the femur extending up to the trochanter major. The pus presented micrococci in bunches. The same condition appeared in the blood. In the third case the gray matter presented a rosy tint. Cultures made with fragments of the medulla, the pons, the spleen and the liver were positive. They contained micrococci. Those prepared

with granulations from the wound presented micrococci and bacilli. In connection with the presence of the bacilli, it should be noted that Billroth found albumen in the urine of subjects of tetanus.

He did not consider the experiments of Nicolaier conclusive. On one hand, he had not been able to obtain by culture the pretended microbe of tetanus. On the other, it is not proven that the affection which he determined by inoculation, was tetanus. In guinea pigs and dogs a convulsive affection is often produced, which is not tetanus, but which may be confounded with it. In his investigations he had not been able to find the microbe of Nicolaier, although that author declares it is easy to stain. Most published observations as to the true nature of tetanus are valueless, because of the absence of microscopical investigations by which alone this delicate question can be decided. He has come to wonder if tetanus is really a specific disease, whether it is not simply a form of septicæmia.

M. BORIES (Montauban) reported a case of traumatic tetanus occurring after a contused wound from a horse's foot in a girl of 13. The patient recovered under morphine and chloral. Subjects of tetanus die not of that disease, but of the convulsions which it determines. Accordingly, it is important to watch the patient carefully and to intervene with chloral and morphine in time to prevent the paroxysms.

M. LARGER (Paris), in addition to those reported to the Société de Chirurgie a year ago, had learned of two instances where the contagion occurred after the lapse of several years. The first occurred in two horses, who were attacked in the same stable, ten years apart. In the second, a factory operative, affected with tetanus after a kick, occupied during his illness a chamber which was not washed nor refurnished, nor changed in any way after that occurrence. Afterward, a wounded man was treated in a chamber adjoining it. Only an incomplete partition separated the two chambers, and the two beds stood side by side with only this open partition intervening. The second patient had tetanus. After referring to the failure of experimental proof of the contagion of tetanus, he declares that, in spite of the failure of those proofs, the clinical proofs seem to him incontestable in this respect.

M. BLANC (Bombay) stated that the mortality of the hospital in Bombay had been influenced, especially by two diseases in the past, pyæmia and tetanus. At the present time pyæmia had disappeared, but tetanus continues its ravages in spite of Listerism. The year at Bombay is divided with respect to tetanus, as well as to cholera, into three periods: (*a*), the cold season, from October 15 to March 15; (*b*), the hot season, from March 15 to June 1; (*c*), the rainy season, from June 1 to October 15. Isolated cases of tetanus are found during all these periods, but the disease prevails especially during the hot season, and the hot days occurring between the rains. These are also the periods at which cholera develops. Three forms of tetanus are observed there:

1. Acute or hyperacute tetanus, which lasts on the average three days and presents a temperature of from 108° to 109° Fahr.

2. Subacute tetanus, which entails death between the tenth and twelfth day by respiratory spasm. The temperature is irregular, and may descend below the normal.

3. Chronic tetanus, which lasts from thirty to sixty days, and which is apyretic.

The degree of the contractures has no influence on the prognosis. The acute form is always fatal; the subacute form is almost always but not invariably so; and the chronic form is quite often curable. Up to the present time there are no known lesion of tetanus. Medullary lesions are wanting in acute cases, but may be found in chronic cases of long duration. They are the consequence of the contractures and the result, not the cause of the malady.

He has tried all modes of treatment, but has not yet found a specific. But some methods do harm; such are operations for nerve-stretching. He has perhaps seen more patients die from chloral than from tetanus. Bromide is dangerous, and has given him nothing but failure. It should be remarked, however, that some patients have resisted at the same time tetanus and bromide of potassium. His treatment consists in avoiding treatment. He simply isolates the patient, avoids cold and combats constipation. Hindoo physicians treat tetanus by purgatives, milk-diet and isolation.



He is far from adopting the equine origin of tetanus, but considers it to be something affecting, not the wound, but the patient himself. At Bombay cases of spontaneous tetanus are frequent, and there is no difference between the traumatic and the spontaneous varieties, except that the latter is more often chronic. He believes that the germ of tetanus is transported by water, and that tetanus is imbibed like cholera.—*Revue de Chirurgie*, November, 1886.

**11. Fermentation, Putrefaction and Suppuration.** By HERMANN KNAPP, M. D. (New York). The writer gives a résumé of the researches of various experimenters, chiefly German, and concludes that fermentation is the decomposition of carbo-hydrates into simpler compounds by the agency of living microbes. Putrefaction is a similar process, the decomposable substance containing nitrogen and sulphur, besides carbon, hydrogen and oxygen. The question of the parallelism of suppuration with the other processes is the chief subject of the author's studies, and he investigates under three heads: (1). Does traumatism of any kind produce suppuration? To answer this question, he made a series of experiments upon rabbits, performing upon the two eyes of the same animal, operations identical in every particular, except that the point of the knife during the second operation was dipped into an emulsion of staphylococcus pyogenes albus. The second day, no irritation in the first, but the hideous picture of a phlegmonous inflammation in the other. In extractions of cataract in rabbits the author has repeatedly bruised and lacerated the iris, evacuated almost all the vitreous, then stirred up the rest with a platinum needle that had previously been brought to a glow, and finally scratched with the same needle the ciliary processes in every direction. Yet, no suppuration ensued, whereas the smoothest and most cautious operations were invariably followed by suppuration when the wound was contaminated in some way by pyogenic fungi. From these experiments, confirmed by many other recorded facts, he concludes that mere traumatism, of whatever kind, never causes suppuration. (2). Do foreign bodies as such cause the formation of pus? A series of experiments in which sterilized foreign bodies were introduced into the

anterior chamber without suppuration while those which had been previously dipped into an emulsion of *staphylococcus pyogenes albus*, invariably produced suppuration, answers the question in the negative. (3). Are there any kinds of chemical agents that cause suppuration without the intervention of microbes? Briefly reviewing the experiments of Straus, Scheuerlein, Klemperer and Ruys, in introducing into the tissues sterilized solutions of chemical irritants—turpentine and croton oil—from which no suppuration resulted in the cases where the experiments were perfectly performed, from which they concluded that suppuration is always caused by bacteria, the author relates a series of experiments of his own in the same general direction, introducing with great precautions sterilized turpentine in a number of cases, but croton oil in the majority, into the anterior chamber and under the skin, completely confirming the conclusions of the investigators referred to, from which he concludes that suppuration in every case depends on the action of microbes. Pus is “an albuminous, non-coagulable fluid containing multitudes of leukocytes,” and suppuration is “the splitting of living nitrogenous tissue into simpler compounds through the influence of certain bacteria.” In this way the parallelism of the three processes—fermentation, putrefaction and suppuration—is established.—*N. Y. Med. Rec.*, Dec. 25, 1886.

**III. Feeding after Surgical Operations.** By JAMES B. HUNTER, M. D. (New York). In a brief paper, the author endeavors to emphasize the facts that: (1) personal attention should be given, with precise directions, to the nourishment of patients after all surgical operations, and too much should not be intrusted to nurses who can have no means of knowing the varying requirements of individual cases; (2) vomiting is to be avoided by every means in our power, even if it require absolute rest for the stomach for several days; (3) even appropriate food, where it can be borne, should be given only in very small quantities and at regular intervals; (4) systematic nourishment by the rectum should be resorted to promptly, if other means fail or are insufficient; (5) less food and more water should be given if the patient suffers from fever; (6) the dangers caused by vomiting,

by flatulence or by food difficult of digestion, are much more to be dreaded than those due to abstinence from food; (7) stimulants are of great value where needed to meet special indications, but may generally be discontinued as soon as food can be digested.—*N. Y. Med. Rec.*, Dec. 18, 1886.

## NERVOUS AND VASCULAR SYSTEM.

**I. Secondary Suture of the Ulnar Nerve with Rapid Return of Sensation.** By F. J. SHEPHERD, M. D. (Montreal) In a man, *æt.* 50, the ulnar nerve had been severed by the blow of an axe between the olecranon process and the internal condyle. Atrophy and loss of sensation and power in the muscles on the ulnar side of the forearm and the little and ring fingers followed. An incision in the line of the nerve and across the scar readily exposed the two ends, the upper being bulbous and the lower atrophied, separated about an inch. The nerve was dissected out, the ends freshened and brought together by a continuous suture of fine catgut, and the wound closed and dressed with dry antiseptic dressing. Fairly good sensation in the ring and little fingers, accompanied with a tingling feeling as if the nerve were asleep, appeared the next day. In 15 days, the wound was firmly united and the patient sent home. Six months later, he reported that he was fast recovering the use of his arm, complaining only of a slight burning pain in the little finger.

T. G. RODDICK, M. D. (Montreal) reported a case of suture of the sciatic 18 months after its division in a man, *æt.* 26. The operation resulted in gradually returning sensation and motion to the foot and rapid healing of two large and troublesome ulcers on the outer border of the foot. Two years later, he could walk without a cane. The point of interest in the case was the rapid healing of the ulcers after the union of the nerve, showing that the nutritive filaments had first resumed their functions, while sensation and motion were still in abeyance.—*Montreal Medico-Chirurgical Society*, Dec. 3, 1886.

**II. Remote Effects of Simultaneous Ligature of the Subclavian and Internal Jugular Veins and the Axillary Artery.**

By LEWIS S. PILCHER, M. D. (Brooklyn). Dr. Pilcher presented the patient upon whom he had performed this operation a year and a half previously for a wound sustained during an operation for the removal of a carcinomatous tumor at the base of the neck [ANNALS OF SURGERY, Vol. III, p. 110]. On exposing the field of operation, it was found that a slit had been torn in both the internal jugular and subclavian veins just previous to their convergence to form the innominate. The original incision having been enlarged and the tissues drawn aside to bring the wounded parts into view, a double ligature was applied to both bleeding vessels. The veins of the shoulder, the transverse cervical and supraclavicular veins having been divided during the operation for the removal of the supraclavicular growth, there seemed to be nothing but the capillaries through which the blood might return to the trunk. In consequence of the great turgidity of the veins of the upper extremity that immediately followed, the axillary artery was ligatured high up. The immediate consequence of the operation was considerable cedema of the arm coming on at the end of a week and persisting for several weeks, but finally leaving the arm in its present condition, which shows some increase of size when compared with the other. It seems as though the tissues in this arm were a little more succulent. There had been no recurrence of the disease since the operation, and the patient was perfectly well.

JOHN A. WYETH, M. D. (New York), in an operation for the removal of carcinomatous glands of the axilla, found the carcinomatous tissue studded along the axillary vein so closely that, in order to remove all of the diseased tissue, he was compelled to ligature the vein and all the branches emptying into it and exsect the part from just below the clavicle down to the brachial region. The patient recovered, and though the circulation of the arm was good, the same succulent condition of the forearm as observed in Dr. Pilcher's case resulted, but she had a very useful arm for sewing and light work. He had seen her a month ago, more than two years after the operation, when she had the first symptoms of a return of her old disease in the glands of the neck and in the lung.—*N. Y. Surgical Society*, Nov. 22, 1886.

**III. Closure of a Wound of the Femoral Vein with Catgut Sutures.** By FREDERICK LANGE, M. D. (New York). In an operation for the extirpation of a malignant tumor in the groin, the femoral vein was accidentally wounded immediately below Poupart's ligament at the entrance of the saphenous vein. The edges of the wounded vein were drawn together with catgut sutures, effecting a complete and perfect closure of the wound, without occluding the lumen of the vein. The loss of blood was not considerable. A lateral ligature did not hold in this case, the walls of the vessel being thickened and resistant.—*N. Y. Surgical Society*, Nov. 22, 1886.

JAMES E. PILCHER (U. S. Army).

#### ABDOMEN.

**Contributions to the Surgery of the Abdominal Organs.** By Dr. OSCAR WITZEL, of Bonn. [Continued from ANNALS OF SURGERY, Vol. I., p. 362].

**RETROPERITONEAL TUMORS.** The author bases his observations upon five cases of retroperitoneal tumors occurring in patients admitted to the Surgical Clinic of Bonn and operated upon by Prof. Trendelenburg or his assistants. The cases are in short as follows:

I. *Retroperitoneal sarcoma of left side. Extirpation by means of lateral laparotomy, combined with extirpation of the normal spleen. Death after several months.*

Woman, æt. 44, first noticed abdominal tumor one year before admission. In the course of nine months it had grown to the size of an apple—and had increased more rapidly of late. The tumor appeared large, round, with uneven surface, of great consistency, yet fluctuating at certain points. It was not adherent to the abdominal skin, and was laterally movable. In the ninth intercostal space in the axillary line a retraction of skin was noticeable over the spleen. Percussion dull. Colon could be made out centrally to the tumor. Urine normal. Diagnosis was made of retroperitoneal tumor.

Operation: 16 July, 1882. Incision at external margin of rectus. Peritoneum divided. Colon freed from adhesions, the mesocolon descendens being partially divided. The tail of the pancreas being

partly imbedded in the tumor, ligated and cut off. In freeing the spleen hæmorrhage occurred, for which ligatures were applied—and it was subsequently found that the blood supply to the spleen had been cut off. The spleen was therefore removed together with the tumor. Suture of wound. No peritonitis. Stitch-hole abscesses. Good improvement for the first three weeks; after that decline. Death after three months, with symptoms of anæmia (hydræmia). No tumor of lymphatic or thyroid glands. No post-mortem.

Tumor weighed five pounds, lobulated, without fluctuating points, microscopically consisting of spindle cells only.

In his epicritical remarks, the author states his belief that the tumor did not originate from the pancreas, but takes it for a neoplasm originating from the connective tissue of the posterior wall of the retro-peritoneal cavity (fascial sarcoma) at a point situated near the pancreas, the vessel of the spleen having been surrounded and drawn into the growth. In this he follows Lobstein, who, however, believes in the lymphatic origin of these tumors. He further refers to Virchow and Koenig.

II. *Diagnostic incision for right lateral abdominal tumor. Tumor sutured to incision-wound. Incision of tumor, which proved to be a round-celled sarcoma. Suture of wound. Dismissal with wound healed.*

Child, 2<sup>1</sup>/<sub>2</sub> years of age. Tumor situated below the liver, reaching to median line and to umbilicus, not to be distinguished from right lobe of liver, resistant to touch, with ill-marked fluctuation, and presenting a smooth, round surface; the whole apparently originating from the lower surface of the liver with a broad base. Colon apparently centrally situated. Diagnostic incision having been made for echinococcus, the tumor was stitched to the wound, incision made and the substance of the tumor microscopically examined, which proved to be a round-celled sarcoma. Excision was therefore not thought advisable; the wound was sutured and healed by first intention, the child being dismissed on eighth day.

III. *Tumor of right kidney. Polypous myo-sarcoma of wall of renal calyx. Extirpation after lateral abdominal incision. Death on sixth day.*



Girl, æt. 4, healthy up to six weeks before admission, when abdomen began to swell. Tumor could be felt on right side of abdomen, reaching to median line and to symphysis, but apparently continuing still further to left side beneath the intestinal coils. Signs of ascites well marked. Surface of tumor uneven; no fluctuation. Percussion of tumor dull, continuous with liver-dulness, which reached to third rib.

Urine could not be collected for measurement of quantity; contained no albumen, nor blood, etc.

Operation, August 29, 1885: Oblique incision letting out ascitic fluid. Tumor found centrally adherent to colon, above and externally to omentum. Omentum freed and ligated; peritoneal covering incised; ligature of large vessels, and enucleation of tumor. Ureter found, ligated and cut. Considerable venous hæmorrhage on freeing the tumor from the liver. A second tumor on left side of spinal column, the size of a lemon, was now found, which could not be removed on account of its relation to the aorta and vena cava. The wound was therefore closed after toilet of the peritoneum.

Child rallied towards evening—was restless the following days. Died on sixth day in collapse, preceded by a temperature of 39.°

Post-mortem examination revealed several large, round tumors the size of apples situated in front of the vertebral column, being the enlarged lymphatic glands.

The removed tumor was found to be a myosarcoma striocellulare, the cystic enlargement of the calyx occupying the greater part of the tumor. A more detailed account is promised by Prof. Ribbert in Virchow's Archives.

IV. *Adeno-carcinoma of right kidney. Removal by means of lateral abdominal incision. Recovery.*

Boy, æt. 9, suffering from a tumor in right side of abdomen, which had first been noticed four years previously. No pain or disturbance of function of abdominal organs had ever existed. But loss of strength had been observed for the last nine months.

On admission the boy appeared pale and somewhat lean, but was not inconvenienced by the tumor, otherwise than that respiration was

frequent. Tumor could not be differentiated by percussion from the liver, dulness reaching to fourth rib above; and it partook of its respiratory movements. Palpation revealed a round, hard body of irregular surface, without fluctuation, reaching downwards into the iliac fossa and to the median line. Injection of water per anum brought the colon out into relief on the right side in front of the tumor.

Diagnosis of renal tumor having been made and extirpation considered indicated, the operation was performed on November 16, 1885. Laparotomy, vertical incision 15 cm. in length, between the axillary and mamillary line. Adhesion with liver divided and ligated. Incision of peritoneal covering of tumor laterally to the colon. Enucleation and eventration of tumor. Ligation of vessels leading to it, and of ureter. Toilet of abdominal cavity. Suture of wound.

Temperature the third evening 38.2° C. Good recovery. Secretion of urine not altered by operation.

Extirpated tumor weighed 2,000 grams, measured 15 cm. in diameter, and proved to be an adeno-carcinoma.

V. *Cyst of Pancreas* (given as appendix). Woman, æt. 23, had noticed gradual development of a tumor in left superior region of abdomen for eight months.

On admission a tumor the size of a man's head was found in the meso-gastric and left hypochondriac region, partaking of the movements of the diaphragm, with smooth surface and well-marked fluctuation. The colon descendens was displaced to the middle line, the stomach was above the tumor.

Operation May 10, 1886. Incision of abdomen 15 cm. in length in left side. The small omentum found covering tumor. Spleen and left kidney found normal. Tapping emptied 2<sup>1</sup>/<sub>4</sub> litres of transparent brownish liquid out of the cyst, after which incision was made into the cyst, and its edges stitched to the edges of the abdominal wound. A fistula was thus established which had closed by the 20th of June.

The fluid removed reacted alkaline, was albuminous, and contained mucin; it did not, however, produce emulsion of fatty substances, nor did it possess digestive properties.

In a short introductory preamble the author alludes to the difference

existing between retro-peritoneal tumors and those developing in the free folds of the peritoneum between the abdominal viscera. The former are more rare; not so movable, appearing, on the contrary, fastened to the posterior parts by a more or less wide base, and displacing the organs of the abdominal cavity in a peculiar and altogether typical manner. The operations for removal of simple abdominal tumors can be mostly performed without causing an extensive lesion of the peritoneum, while removal of the retro-peritoneal tumors entails very extensive interference, if not resection, of the peritoneum, and moreover establishes a large cavity, in which secretions may stagnate; the technical aspect of the latter operation is rendered more difficult and important, on account of the presence of the large vessels of the retro-peritoneal region, indiscriminate ligating of which may cause the death of one or more of the abdominal organs.

Two kinds of retro-peritoneal tumors may be distinguished—the median ones, which originate from the region of the spinal column, and from the root of the mesentery, and the lateral ones, originating in the cavity on either side of the spine.

The former ones rarely grow towards the front, unfolding the duplications of the mesentery and surrounding the loops of small intestine in their anterior aspect. These tumors are very difficult to remove, because the intestines have frequently to be exsected, and the blood-supply is derived from behind. The majority of the median tumors grow laterally, as do especially the lateral ones, and in this case the colon always bears a typical and diagnostically very important relation to the tumor, it being situated at first laterally, then directly in front and finally centrally to the tumor. These tumors can be more easily removed than the median ones, especially if their peritoneal covering is widely incised. Resection of the colon is scarcely ever necessary.

In none of the four cases, in which tumor of the kidney was present, could the diagnosis of kidney-lesion be made with certainty before operation; a very usual occurrence in such cases.

After further remarks of a general nature, the author turns to consider the median retro-peritoneal tumors more especially, and having no cases of his own of this kind, refers to five or more already published ones.

In many cases where such tumors cannot be differentiated from ovarian and other abdominal tumors, the presence of œdema of the lower extremities resulting from pressure upon the vena cava, as well as obstruction occurring more or less suddenly in the intestinal tract, are symptoms of great value for diagnosis.

Regarding the operative interference with these tumors, the author is in favor of not attempting removal too speedily. In view of de Jong's statistics the author does not consider lumbar nephrectomy less perilous than that by lateral abdominal incision, which removes another reason for early operation. On the other hand, the colon can be much more easily preserved intact with reference to its blood-supply, if the incision through the peritoneal covering of the tumor be made laterally to it, at a time when the colon has moved to the inner side—or, in other words, when the tumor has grown to a considerable size.—

*Deutsch. Zeitschr. f. Chirurgie.* Vol. 25, Hft. 3. Aug. 25, 1886.

W. W. VAN ARSDALE (New York).

#### EXTREMITIES.

**I. Reunion of Severed Digits.** This subject has recently received considerable attention and a number of new cases have been recorded. For convenience of reference they are tabulated below.

## REUNION OF SEVERED DIGITS.

No.	Operator.	Age and Sex.	Digit.	Amount Severed.	Instrument.	Time between accident and operation.	Treatment of severed portion.	How secured.	Result.	Reference.
1	A. A. D. Loffre.	Adult, male.	Ring finger, left hand.	One-half inch.	Axe.	Twenty minutes.	Washed in tepid water.	Strips of plaster and hermetically sealed with collodion.	Perfect cure.	Boston Med. & Surg. Jour., Dec. 23, 1886.
2	O. N. Bradbury	Boy, 7 years.	Index finger, left hand.	All from just above second joint.	Axe.	25 minutes.	Warm ed in warm water.	With 2 stitches; strapped and carefully splinted.	Cure with mer's trace of scar; perfect action of joint.	Boston Med. & Surg. Jour., 1886.
3	C. W. Galloupe.	Adult, male.	Thumb, left hand.	All above diagonal line from the base of the nail downward nearly to the joint.	Axe.	Several minutes.	Wiped and replaced.	By strips of plaster.	Cure with diminished sense of touch.	Boston Med. & Surg. Jour., Nov. 25, 1886.
4	I. F. Galloupe.	Adult, male.		All above the base.	Sole-cutting machine.	While running a distance of 200 feet.			Cure with impaired sensation.	Loc. cit.
5	N. Nivison.	Boy, 7 years.	1st, 2nd and 3rd fingers, left hand.	All above a diagonal line beginning in middle phalanx of index finger and terminating in last phalanx of 3d finger near root of nail.	Axe.	3 or 4 hours	After lying in the snow for some time, were fished out and kept for 2 or 3 hours before being applied.	By whale-bone splints, adhesive plaster and bandages.	Cure except last phalanx of index finger which sloughed off; no loss of function.	Boston Med. & Surg. Jour., Oct. 21, 1886.
6	W. P. Souther.	Adult, male.	One finger.	$\frac{3}{4}$ of an inch, including the nail and about $\frac{1}{2}$ inch of last phalanx	Paper-cutting machine.	Some time.	Was brought wrapped up in a handkerchief.	Adjusted to the stump.	Cure.	Boston Med. & Surg. Jour. Oct. 7, 1886.

7	J. J. Morrissey.	Adult, male.	Thumb.					Parts approximated as much as possible and afterward splinted.	Cure without loss of function.	Med. Rec., Nov. 13, 1886.
8	Dr. Frew.								Cure.	Med. Rec., Nov. 13, 1886.
9	E. E. Smith.	Adult, male.	Finger.	All above middle of second phalanx	Hoop iron band on a packing case.				Cure.	Med. Rec., Nov. 13, 1886.
10	T. J. Hutton.	Adult, male.	Index finger.		Hatchet.				Cure.	Med. Rec., Nov. 13, 1886.
11	T. J. Hutton.	Adult, male.	Finger.	All above middle of second phalanx.	Two sharp edged bars of iron.				Cure.	Med. Rec., Nov. 13, 1886.
12	J. M. Perkins	Boy, 7 years.	Index finger.	All above first phalanx.	Wheat drill.		Second phalanx crushed and completely extirpated.	Lacerated tissue removed; 1st and 3d phalanges adjusted together.	Cure.	Med. Rec., Mar. 28, 1885.
13	S. D. Ivanoff.	Adult, male.	Index finger, right hand.	Second phalanx cut through the interphalangeal joint.	Axe.	2 hours.	Washed with antiseptic solution; parts connected by narrow bridge of skin.	By sutures and dressed with iodoform.	Cure with return of sensibility and limited motion.	Re-Ruskaia Med-itzina.



## REUNION OF SEVERED DIGITS.

<i>No.</i>	<i>Operator.</i>	<i>Age and Sex.</i>	<i>Digit.</i>	<i>Amount severed.</i>	<i>Instrument.</i>	<i>Time between accident and operation.</i>	<i>Treatment of severed portion.</i>	<i>How secured.</i>	<i>Result.</i>	<i>Reference.</i>
14	S. D. Ivanhoff.	Adult, male.	Left thumb.	Second phalanx cut transversely a little above the interphalangeal joint.	Axe.	3 hours.	Washed with antiseptic solution.	By sutures and iodoform dressing.	Cure with return of sensibility and limited motion.	Loc. cit.
15	M. Thomas.	Adult, male.	Third finger.	Integument of the entire finger torn away.	Caught in an iron railing & pulled away by weight of body.	1 hour.		Bones reintroduced into the finger; two sutures applied and hand bandaged.	Cure, with loss of last and part of second phalanx.	Soc. de Chirurg., Paris.

II. The Abortive Treatment of Phlegmon, Especially of the Fingers, by Resorcin Inoculation. By LUDWIG WEISS, M. D. (New York). Following the methods of Andeer of Munich, the author had used resorcin epidermically in the form of an ointment in furunculosis, with varying success. It happened that in those cases in which the necrotic plug was about to separate, the resorcin applied to the denuded surface hastened involution. He concluded that if it were possible to introduce resorcin into the center of infection, not only would the noxa be destroyed locally, but by virtue of the rapid absorption of the drug in the lymphatics, the virus already there deposited, might be rapidly destroyed and, provided the treatment had been resorted to in time, surgical interference be obviated. Accordingly the plan was first tried in the cases of three physicians, who were suffering from developing phlegmons of the fingers with complete success, which was obtained in other cases afterward. The characteristic dense connective-tissue structure of the finger pulp, the compression to which the inflamed and engorged parts are subjected (making the lymph capillaries impermeable), and the callousness of the epidermis of the finger tips, act as barriers to absorption, which are, however, overcome by making minute parallel incisions through the epidermis, perpendicular to the finger-axis when made in the tip, and at right angles to it on the nail fold. A hæmorrhage, no matter how slight, is absolutely unnecessary and harmful, though a slight bloody point from an injured capillary at the bottom of an incision is of no consequence. The next step is to abundantly apply the salve to the affected parts, which is done by plunging the affected finger into the salve-pot, so that by directly impregnating the scarifications, rapid absorption may result; a strip of lint, thoroughly saturated with the ointment, is then closely wrapped about the finger and the whole covered by gutta-percha tissue; a layer of cotton and a moist gauze bandage complete the dressing. It is sufficient to renew the impregnation twice daily, though the subjective sensations of the patient are the best guide as to this. If the scarifications are sufficiently numerous to absorb the resorcin, an amelioration of the pain and tension is noticeable in from six to twelve hours. For inoculation an ointment of

resorcin in a strength of from 10 per cent. to 30 per cent. was found to be the most serviceable, and to facilitate absorption the author added a small quantity of the more easily absorbable lanolin. One of the first requisites to the success of the treatment is its timely application; in the stage of erythematous redness, when the dorsal surface of the ungual phalanx or the nail-fold is reddened and glistening, when the patient first experiences pain, resorcin inoculation will positively abort the inflammation and prevent suppuration; the same favorable result is also obtained in volar phalangitis, provided the case presents itself before the exudation has exerted such pressure on the dense vertical fasciculi of connective tissue as to cause necrobiosis and suppuration; when severe pain sets in in a circumscribed area of the finger-tip, which may appear turgescient, reddened and pulsating from the engorgement of its vessels, lymphangitis and lymphadenitis already commencing to show themselves, perhaps the finger being held in an elevated position, the process is still within the reach of resorcin treatment. In whatever situation the original lesion may be located, the inoculation is performed in the area involved by the point of invasion. The epidemic use of resorcin along the track of inflamed lymph canals is of distinct importance and should be applied in every case in which lymphangitis exists. Used in this manner, resorcin will prove an effective remedy in all furuncular and phlegmonous inflammations, aborting the inflammation if used in time, by destroying the germ locally as well as in the lymph canals leading from the point of infection, and at the same time acting as an anæsthetic on the terminal filaments of the sensitive nerves.—*N. Y. Med. Rec.*, November 27, 1886.

**III. Rupture of the Long Head of the Biceps Brachii Muscle.** By G. H. MONKS, M. D. (Boston, Mass.) Four cases of this accident are reported. It appears in all cases to be due to an overstretching by a violent contraction of its muscle or by a sudden protrusion of the head of the humerus forward or by both causes acting together. Cases occurring in the young and healthy are rarely met with and are then the result of extreme violence, and the injury is quite severe: a distinct snap is generally felt, followed by a stinging

pain in the shoulder and along the bicipital groove; motion of the arm is painful, particularly extreme flexion of the fore-arm upon the arm; and when the forearm is supinated, flexion is almost, if not quite impossible. In those more advanced in years, the tendon may be weakened, presumably by senile atrophy or shoulder joint disease so as to require but a slight force to tear it through; the symptoms already described are much less marked in these cases, and some of them may even be wanting entirely; the snap of the breaking tendon is often not noticed by the patient; the pain and disability may be not marked, or may even be so slight as not to interfere with a continuance of his ordinary avocations. All cases show essentially the same deformity; the belly of the affected muscle is unnaturally full, so much as at times to suggest the idea of a tumor; above the swelling is an abnormal depression in which the tendon can be felt; the muscle, though apparently firmly contracted, is soft and flabby and the patient is unable to make it as hard as the muscle of the other arm. In case of a partial rupture, these indications are absent and reliance must be placed upon localized pain and tenderness and altered function of the muscle following an injury, which would in favorable cases be likely to cause a rupture. The treatment is rest; a circular bandage about the arm below the flaccid muscle will raise it up slightly and tend to relieve the ruptured tendon of all unnecessary weight. The elbow should be kept at the side and the arm in a sling. Pain and disability may persist for months, though this is rare, but eventually the function of the part is pretty sure to be restored. The torn end of the tendon acquires a new attachment upon which the muscle learns to act. Proof that such an arm will ever again be as strong as before the accident is lacking, but it is quite certain eventually to be a useful one. Such being the case, operative interference, such as laying open the joint and suturing the two torn ends of the tendon, is contraindicated.—*Boston Med. and Surg. Jour.* Nov. 25, 1886.

#### GENITO-URINARY ORGANS.

**Nephrotomy and Nephrectomy.** This was the order of the day on the second day of the last meeting of the French Congress of

Surgery. M. LE DENTU (Paris), in opening the discussion, remarked upon the superiority of the French statistics of nephrectomy. He then proceeded to discuss the cases where nephrotomy should precede nephrectomy, as follows;

1. In renal suppuration, in clearly limited suppurations, pyonephrosis proper, the operator has frequently to perform nephrectomy because the operation has been delayed too long. The exploration should be made under chloroform to relax the abdominal walls and render the examination more easy; when fluctuation is observed or that elasticity which is the next thing to it, incision is necessary. By operating thus in good time, a cure can be obtained without fistula, which is important in view of the difficulty of obtaining cicatrization of renal fistula.

2. In simple hydronephrosis.

3. In multilocular cysts, even when they protrude toward the abdomen. If a fistula persists, there will always be time to perform nephrectomy, and this operation is then less dangerous, as is shown by statistics.

He objects to the straight incision of Simon because it does not give enough room. The L-shaped incision of Koenig, with the horizontal incision extending from the external border of the rectus and even to the umbilicus, is cutting the body half in two, and exposes the patient to eventration, for muscular suture is not without failure; in cases of very large tumors, removal piece-meal is preferable. The curved or oblique incisions are the best.

The different elements of the pedicle should be ligatured individually as far as possible. To facilitate the passage of the ligature, he had devised a curved needle with a large eye.

The application of transperitoneal nephrectomy is limited, especially as the lateral, retro-peritoneal operation of Thornton permits the kidney to be approached from the front; the detachment of the peritoneum is not serious. There are cases where the transperitoneal method seems indicated and where, however, the retroperitoneal method succeeds better. And perhaps floating kidneys will be amenable to nephrorrhaphy, which seems to be a good operation.

The communication closes with a report of three cases. One was

performed for a fistula of the ureter; the patient had been cured for five years. Another, undertaken for a calculus, was also followed by cure; but now the trouble had recurred on the other side. The third operation, for renal tuberculosis, had left two fistulæ. He remarks in conclusion that nephrectomy is a good operation and one of the most splendid achievements of surgery.

J. LUCAS CHAMPONNIÈRE (Paris), had performed one nephrotomy with recovery, and three nephrectomies, with two deaths. The nephrotomy occurred in a woman, who had passed thirteen days without voiding a drop of urine; after nephrotomy, twenty-one days more passed without a single drop of urine being eliminated by the bladder; then the patient passed a calculus by the urethra, the course of the urine was re-established and the fistula healed up. Contrary to M. Le Dentu, he thinks that in these conditions, renal fistulæ cicatrize very rapidly.

Of the three nephrectomies, the first was done for pyelo-nephritis and terminated in cure. The second was done *in extremis* for suppurative nephritis, and the patient died of shock. The third was a transperitoneal operation for hydronephrosis; death supervened in two and one-half days by uræmia, the kidney of the opposite side being very small and insufficient. It is worthy of note that in the first case, there was but one kidney and that if nephrectomy had been done, she would surely have died.

With regard to the comparative value of nephrotomy and nephrectomy, the surgeon is often obliged to follow the first by the latter, in cases of suppurative nephritis or renal calculi for example. But should nephrotomy always be done first in pyonephrosis? It is useless in most cases, and it is preferable not to impose two operations on a patient, the more as the second is more difficult to perform antiseptically; but if the patient is debilitated, nephrotomy should be performed first, for nephrectomy determines a shock more grave than ovariectomy. In the matter of operative methods he agreed with Le Dentu.

M. BOUILLY (Paris) had done four operations on the kidney. The first was for renal suppuration of very long standing; after nephrotomy, the cure was delayed until a purulent deposit in a cavity which, not-



withstanding great care to destroy all septa, had escaped him, opened spontaneously into the colon. Polycystic suppurations of the kidney are frequent; all the cavities should be opened and, to attain this result, considerable incisions giving much light must be made. The second case occurred in a man æt. 20; a perinephritic collection was opened and the kidney denuded; pressure with a finger determined the bursting of two intra-renal caseous foci, which were scraped and dressed with iodoform, with recovery in forty days. The two nephrectomies were performed for very painful floating kidney, both patients being cured.

M. RELIQUET (Paris) had incised the kidney three times; once for cancer, once for abscess and once for renal suppuration consecutive to traumatism. In all cases, the general phenomena were extremely grave and necessitated immediate intervention. The patients were suffering from excessive and continual renal colic; there was almost complete anuria, which disappeared after simple incision and improvement of the general state.

This singular fact of the reappearance of the urine immediately after section, had caused the speaker to inquire if in cases of grave nephritic colic, when the affection seems to have become almost positively fatal, the affected kidney should not be incised; he would not hesitate to do so.

In one case the right kidney was full of calculi; on the left side there were two kidneys and two ureters.

M. DEMONS (Bordeaux) had operated upon the kidney three times; the first was a nephrotomy for pyonephrosis and the patient died of exhaustion. He thinks that in cases of pyonephrosis with perinephritic abscess, he would prefer nephrectomy. The second case was a perinephritic abscess and fistula through an intercostal space, consecutive to a wound; retro-peritoneal nephrectomy cured the patient. The third was a renal sarcoma, which had been supposed to be an ovarian cyst; the operation was transperitoneal, there was no drainage, and the cure supervened uninterruptedly. He considers ligature of the pedicle *en masse* entirely sufficient and isolated ligature of the ureter useless.

M. MALHERBE (Nantes) reported a case of nephrectomy for pyonephrosis, in the course of which the peritoneum was opened to an extent of five or six cm. without harm; rather abundant suppuration delayed the cure, which was not complete until after four months.

M. SCHWARTZ (Paris) reported a case of renal abscess which projected only toward the abdomen; it was opened by the transperitoneal method and rapid cure ensued.

M. JEANNEL (Toulouse) reported a case where, the patient presenting symptoms of internal strangulation, laparotomy was performed, disclosing a tumor of the kidney which had penetrated between the layers of the mesentery; nephrectomy showed that the descending colon had been compressed by the tumor; the patient died of shock.

M. PEAN (Paris) had performed seven operations, six successfully; the seventh died of uræmia, the other kidney being insufficient. For floating kidney, he thought that nephrorrhaphy was often sufficient treatment. He preferred lumbar section wherever it was applicable, *i. e.* in small tumors and those which can be subdivided; for large tumors, he prefers the transperitoneal operation and makes the incision in the linea alba. He always treats the pedicle by first applying forceps, resecting the tumor, and then applying the ligature.

J. BÖCKEL (Strasbourg) had performed nephrectomy once by lumbar incision—this remarkable case may be found in detail in the *ANNALS OF SURGERY*, vol. i., page 73—and once by the transperitoneal method *for hydatids of the kidney*. Nephrectomy for hydatid cyst has been performed but three times; the patients of Spiegelberg and Hæckel both died very soon; this case was more favorable, the kidney having suffered a displacement which had rendered it to a certain extent mobile, and the cure was complete in six days. The incision was in the linea alba; the pedicle ligatured in three fasciculi and the edges of the lumbar peritoneum were not sutured. The diagnosis was not positive and the presence of a large tumor in the abdomen, alone determined the laparotomy. In case of hydatid cyst, nephrectomy should be done as early as possible; if exploratory laparotomy shows that it is impracticable, the cyst should be incised and the sac sutured to the abdominal wall.

M. SECOND (Paris) had performed nephrectomy twice; the first occurred in a woman. æt. 45, with a very large and painful tumor and a very grave general condition, lumbar section and subcapsular enucleation being performed; before reaching the kidney, it was necessary to traverse five or six centimeters of fatty, lardaceous and vascular tissue from which considerable hæmorrhage proceeded; in spite of ligature, so much hæmorrhage proceeded from the pedicle that forceps were applied, immediately after which the bleeding became formidable but was controlled by tamponing the cavity: he emphasizes the fact that it was the forceps—*pince à kyste*—that determined the hæmorrhage; notwithstanding an intercurrent attack of erysipelas, the patient recovered. The second case was a transperitoneal operation for floating kidney, the operation lasting fifteen minutes and the patient getting up on the fifteenth day.

U. TRELAT (Paris) dwelt upon three points, (1) the choice between nephrotomy and nephrectomy, (2) the question of extra- and intra-peritoneal operations and (3) subcapsular enucleation.

Certain cases positively indicate nephrectomy; such are persistent fistulæ, neoplasms which must be extirpated, and floating kidneys. The indication is not so clear in other cases, such as renal calculi and their consequences, hydro- and pyo-nephrosis, etc. To-day the indications for operation cannot be positively settled; however in case of tumors characterized by localized pain in the region of the loins and projecting there, the incision should be made in the lumbar region in such a way as to permit a simple nephrotomy, if this is sufficient, or a nephrectomy, if necessary; the lumbar method in such a case becomes logically unavoidable; neither the transperitoneal nor the paraperitoneal methods are proper.

If a neoplasm or a fistula be in question, the choice of method is more uncertain; there are no determining reasons for one more than the other, but in certain cases the diagnosis is doubtful or erroneous and the abdominal location of the tumor leads to laparotomy and the transperitoneal operation. While the method is not to be absolutely rejected, it should be used with reserve.

Certain renal tumors, instead of projecting into the abdomen or

loins run along the peritoneum, skirt the abdominal wall and really project beyond on the side. In these cases, the paraperitoneal method of Langenbuch is good; consisting of an incision at the external border of the rectus muscle, or better a little external to it—because the peritoneum is particularly adherent and difficult to manage at that point—and making a way between the peritoneum and the abdominal wall.

For choice of procedure then, the cases divide themselves into two classes, (1) the inflammatory cases in which the lumbar incision is proper, and (2) all other cases, in which the indication is less positive and more variable.

But whatever method be followed, the kidney has to be separated from surrounding parts. In certain cases, the cellulo-fatty envelope is thickened, indurated and vascularized, and the enucleation of the kidney is extremely difficult, in which case, the subcapsular method is necessary. He had lost one patient, whom this method would have saved; after removing the gland, a little blood continued to ooze from one corner and a pair of hæmostatic forceps were applied and removed the next day; the patient died on the seventeenth day because the contact of the forceps with the intestine had determined a stercoral fistula. The subcapsular method would have saved the patient, as it did in a later case. He concludes as follows:

1. A great many cases imperatively demand the lumbar method with preliminary nephrotomy.
2. Other cases demand nephrectomy, and sometimes the trans-peritoneal, sometimes the paraperitoneal, and sometimes the lumbar operation is to be preferred.
3. Whenever the cellulo fatty envelope of the kidney is indurated, subcapsular enucleation is demanded.—*Revue de Chirurgie*. Nov. 1886.

**II. Subcapsular Nephrectomy.** M. OLLIER (Lyon) spoke of this procedure, by which he meant the enucleation of the kidney from its capsule. He was drawn into this procedure accidentally; finding, in course of a nephrectomy, a cellulo-fatty envelope so thick

and resistant that he could not detach the kidney; whereupon, he cut a little deeper and enucleated it from its capsule with the greatest facility; since then, he has performed the operation in three cases of pyelo-nephritis and one of tuberculosis. The enucleation should be made slowly and with care, in which case it is easy and hæmorrhage need not be feared. Subcapsular nephrectomy is not applicable to all cases; if the kidney is small and healthy, it is better to extricate it from its fatty envelope; the question is more delicate in acute affections, for we know little of the adhesions established between the kidney and its capsule in these affections; he determined acute nephritis in dogs; at the end of three months there certainly were adhesions established between the kidney and its capsule; nevertheless subcapsular enucleation produced less hæmorrhage than detachment by the other method. In chronic cases, he would have no hesitation in adopting it. The method has general and particular advantages; the chief of the latter is ready separation in cases where the fatty envelope is indurated; it is well known that in these cases of fibro-lardaceous thickening, the fatty envelope is very vascular. Extirpation by the ordinary method is then not only very difficult but dangerous, for it exposes the subject to grave hæmorrhage, which is avoided by the subcapsular method. The general advantage of the method lies in the fact that the operation is farther from the peritoneum, avoiding peritonitis by propagation. This method is then especially valuable for large tumors; naturally it is contraindicated in cases of neoplasm, since in these cases the extirpation should be as comprehensive as possible.

In general, he advocates plenty of room, and does not fear large incisions; unlike M. Le Dentu, he believes that muscle sutures may be of great service. There are cases where, in spite of free incisions, the kidney cannot be removed; then the twelfth rib should be resected; he had seen one case where the ilio-costal region was but three cm. in height; in such a case he would not hesitate to resect the eleventh rib also, which operation, performed subperiosteally, does not involve serious danger.—*Revue de Chirurgie*, Nov. 1886.

### III. Suprapubic Cystotomy for Sarcoma of the Bladder.

By F. LANGE, M. D. (New York). A man æt 53, always previously

in good health, had suffered for four or five years from hæmorrhage after micturition, usually small in amount, but at times quite abundant, and latterly small fleshy lumps had been discharged. Microscopic examination of one of these lumps showed numerous disintegrated cells of pretty large size in advanced fatty degeneration; only the rather large nuclei could be distinguished with certainty; another smaller piece brought out in the eye of the catheter, showed distinct papillary structure with a regular lining of columnar epithelium. Neither by palpation through the rectum nor by means of the catheter could the existence of a tumor be corroborated. On suprapubic section, notwithstanding a balloon in the rectum filled with 250 cc. of water, and about 300 cc. of boracic solution in the bladder, and later, the addition of still more fluid in both cavities, the bladder failed to rise noticeably above the pubes; the peritoneum had to be stripped back, and it was observed that the bladder was very flabby and apparently parietic. The patient was then brought into the elevated pelvic position of Trendelenburg, which causes the bladder to become distended by negative pressure, like the vagina in Sims' position, the intestines retiring toward the diaphragm; with light from above and a sufficiently large vesical opening, even the posterior wall of that organ became easily accessible. The tumor was found about one cm. behind the right ureter, and did not occupy an area larger than two cm. in diameter; it was flat and its superficial layers were soft and easily yielded to the sharp spoon; it was thoroughly scraped, and then the basis with some apparently healthy tissue all around, extirpated. Microscopical examination showed a small round-celled sarcomatous mass, in the midst of which bulbs of large-celled sarcoma were to be seen; these had no connection with the small-celled sarcoma and, while in some places they are completely mixed and interwoven with the small cells, only the bulbs of the large cells had distinct boundaries; the preponderance of small cells entitled the neoplasm to be called a small-celled sarcoma. The operator had been able to find no recorded instance of such a tumor of the bladder, those described all being fibro-sarcomata. The wound was stitched with dry iodoform catgut sutures; the anterior section in the bladder was likewise closed by catgut



sutures, which did not pass through the mucous membrane ; the lower portion of the abdominal opening was left open and loosely packed with iodoform gauze. A Nelaton catheter, permanently left in the bladder became repeatedly clotted with blood especially about the fourth or fifth day, when there occurred some hæmorrhage from the bladder, which was easily checked by cold injections and *tinct. ferri mur.* Not a drop of urine escaped through the abdominal wall and, at the end of two weeks, the patient was sent to his home.

As a result of the distention with the rubber ballon, the anterior wall of the rectum was ruptured about three-quarters of an inch above the anus but happily the peritoneum was not torn. To obviate this accident, the operator advised balloons of thinner and softer rubber and of greater length.

Dr. Lange had used suture of the bladder after suprapubic section in five cases, in four of which the operation was for stone. In all of these cases, primary union had taken place and no urine had escaped through the abdominal wall. He thought it a point of some importance that the mucous membrane should not be taken into the suture and that fine needles and thin thread should be used, the latter being the dry iodoform catgut which, after being soaked within the suture canal, will exactly fit it and not easily allow the entrance of urine ; he always applies the first and last sutures exactly corresponding to the upper and lower angles of the wound, or rather beyond it, and ties the sutures while some light traction on the edges of the wound is made parallel to the direction of the wound. The elastic wall of the bladder will afterward become shorter and thicker, and the closure of the wound will be a very accurate one.—*N. Y. Surg. Society* Nov. 8, 1886.

#### IV. Suprapubic Cystotomy for Sarcoma of the Bladder.

By ROBERT F. WEIR, M.D. (New York) A man, æt. 35, had suffered from several severe recurring hæmorrhages of the bladder ; exploration with a sound revealed nothing decisive, although the urine twice became almost jellied from effused fibrin, a condition considered by some pathognomonic of a tumor, but which the author has found in a case of

cystitis for which perineal cystotomy was done and in which no tumor existed. Examination by the rectum under ether revealed a resisting mass to the left of the median line, and the resistance to the movements to the left of a sound rather forcibly used, confirmed the diagnosis. The rectum being distended by the water-bag, and the bladder filled with seven ounces of 1-20,000 bichloride solution, which caused all the lower part of the abdomen to bulge forward and secured percussion-dulness for nearly two and a half inches above the symphysis, the abdominal wall was then incised; after the division of the linea alba, and during the dissection of the prevesical fat with the handle of the scalpel, there was rather profuse bleeding from numerous small veins, which required ligature. The bladder was then incised, and an irregular, reddish, friable tumor, pressed forward by the distention of the rectum, at once became apparent. The mass was so soft that it broke down in the attempts to remove it, causing considerable oozing of blood, promptly arrested, however, by the pressure of a sponge; the attachment of the tumor, which microscopical examination afterward showed to be a sarcoma, was about three-fourths of an inch in diameter, circular in shape and with depressed and irregular edges. It was thoroughly and forcibly scraped with a sharp Volkmann's spoon; considerable bleeding came from the adjacent mucous membrane, which somewhat interfered with the precision of the operation, but was finally checked by pressure and hot sublimate douches and more particularly by the emptying of the rectal dilator. The wound was not stitched, but, a drainage-tube being introduced, the edges of the wound were packed with sticky iodoform gauze and a loose antiseptic gauze dressing applied, through which the drainage-tube ran. Patient passed on to a good recovery, but six weeks later, he suffered from obstruction which was relieved by the giving way of the lower end of the cicatrix and the establishment of a small suprapubic urinary fistula which has continued with occasional closures. When last seen, about five and a half months after the operation, a decided increase in prostatic fulness on the left side could be felt, which together with his emaciation, told that recurrence had undoubtedly taken place, although there had been no further hæmorrhage. In connection with this case,

the author remarks, (1) in view of the difficulties that arose from wounding the veins immediately external to the bladder, it would be better, when a vein is exposed, to pass a double ligature under it, tie it and then divide it between the ligatures; should the bleeding be free from small vessels, instead of stopping to secure these and thus disturbing the connective tissue in front of the bladder all the more, it would be wiser to open the bladder and relieve the congestion, when the hæmorrhage will cease. (2) Referring to the danger of rupture of the bladder, the writer reviews the results of Pousson and Dittel, and advocates filling the rectal balloon (which should be done first) slowly, and as soon as decided resistance was felt, forcing no more in; he was unwilling because of the danger of vesical rupture, to inject into the bladder as much as eight or ten ounces, as advocated by Thompson, and halted at seven ounces. Next, referring to the danger of rectal rupture as illustrated in the case of Lange, he expressed a belief that no more than ten ounces of fluid need be used, and he had contrived a rubber bag with fine silk meshes outside, like the middle bag in the Paquelin cautery apparatus, to limit the distention of the contained rubber to a circumference of seven and a half to eight and a half inches, which his investigations had shown to be the limit of safe rectal distention. (3.) While suture of the wound has often been successful, the author has too frequently seen the irritation or plugging up of a retained catheter cause it to fail in its desired end, to trust to it in a suprapubic cut. (4.) Should any suppuration of the prevesical tissue occur and be detected, drainage should be essayed by carrying downward a long dressing forceps behind the pubes, and cutting on its point in the perineum; and by pulling through this track a tube sufficiently large for the easy flushing and draining of the gravitating pus and urine.—*Med. News*, Dec. 4, 1886.

**V. Treatment of Stone in the Bladder.** By A. T. CABOT, M. D. (Boston, Mass.) This paper is based upon the following twenty-four operations:

	Age.	Sex.	Duration of Symptoms.	Operation.	Stone.	Weight in Grains.	Result	Remarks.
1	65	M	4 or 5 months	Litholapaxy	Phosphatic	270	Recov	Multiple Calculi
2	66	M	3 or 4 months	Litholapaxy	"	127	"	Multiple Calculi. Recurrence of No. 1.
3	10	M	Since infancy	Lateral Lithotomy	Calcic Oxalate	132	"	
4	69	M	1 year	Litholapaxy	Phosphatic	98	Died	Death from bronchitis
5	53	M	2 or 3 years	"	"	78	Recov	
6	61	M	1 year	"	"	94	"	
7	67	M	5 months	"	"	121	"	Stricture divulsed
8	73	M	2 or 3 years	"	"	20	"	
9	57	M	A few weeks	"	Uric Acid	10	"	
10	20	M	6 months	"	Phosphatic	113	"	Nucleus, a leather shoe-string which had been used as a bougie.
11	67	M	1 1/2 years	"	Uric Acid	150	"	Epididymitis, etc.
12	47	M	1 year	"	"	80	"	
13	60	M	1 year	"	Phosphatic	140	"	Recurred 5 m'ths later.
14	50	M	2 months	"	Uric Acid	23	"	Multiple calculi; recurrences.
15	75	M	3 months	"	"	19	"	Recurrence,
16	74	M	9 months	"	Phosphatic	34	"	Recurrence of No. 8, with a retained fragment as a nucleus.
17	70	M	1 or 2 years	"	Uric Acid	143	"	
18	48	M	2 years	"	Phosphatic	68	"	Stricture divulsed.
19	55	M	2 1/2 years	"	Uric Acid	225	"	
20	68	M	1 1/2 years	"	Phosphatic	265	"	
21	49	M	8 years	Suprapubic Lithotomy	————	1180	"	Stricture and false passages.
22	53	F	Several years	Litholapaxy	Phosphatic	140	"	
23	60	M	5 or 6 months	"	"	95	"	Prostatotomy done at the same operation.
24	63	M	5 or 6 months	"	"	79	"	

He concludes that litholapaxy should be performed in all ordinary adult cases except when (1) a very large and hard stone may resist every attempt at crushing; (2) a stone may have as a nucleus a foreign body, such as a piece of necrosed bone or a bullet, too hard to crush and too large to come through a tube; (3) an encysted stone may be out of reach of the lithotrite; (4) some writers think that stricture of the urethra may prohibit litholapaxy, but this cannot often happen, for strictures, however close, yield readily to divulsion, which may be immediately followed by the crushing and evacuation of the stone; while this procedure economizes time, it also saves the patient much needless manipulation; (5) false passages may exist, which so interfere with the introduction of instruments that the dangers of the operation are greatly enhanced and the question of lithotomy is to be entertained; (6) the hip may be ankylosed in a position such as to interfere with the use of urethral instruments. Supra-pubic lithotomy is to be employed in cases where the stone is too large or too hard to be crushed, where an impervious stricture makes the introduction of a lithotrite or staff impossible, or in case of an encysted stone. Perineal lithotomy may be reserved for occasional use upon stones of moderate size where false passages or ankylosis of the hip makes litholapaxy impossible, or where a stone has a foreign body as a nucleus; it is possible that supra-pubic incision may eventually prove to be the best for even these cases, but at present, the percentage of recovery after lateral lithotomy in cases of small calculi is better than in the high operation. The treatment of stone in children is unsettled, the weight of evidence balancing between the three methods and rather inclining toward the lateral operation.

*Recurrence of stone.*—*A.* A uric acid stone may be followed by another on account of the persistence or reappearance of the uric acid diathesis; cases 14 and 15 are examples of this. *B.* A soft phosphatic stone may be reproduced after removal, if the chronic cystitis and alkaline condition of the urine persist which led to its original formation; this is not infrequently seen in those cases where an obstruction to the complete emptying of the bladder perpetuates the fermentation of the urine; cases 1, 2 and 13 belong to this class. *C.*

Sometimes the successive escape of several stones from the kidney gives rise to several consecutive attacks of stone in the bladder. *D.* Lastly, if a fragment is left after an operation, it may serve as a nucleus for another stone, as in case 16; as a guard against such retention of fragments after litholapaxy, the bladder should always be washed out with the evacuator one or more times after the operation, before discharging the patient, which can readily be done without ether; in using the pump, the sacculated character of many bladders should be remembered, and a careful search should be made, lest a fragment be caught and held in some side pocket; the orifice of the evacuating tube should be turned successively toward each part of the cavity, in order to dislodge with the current any such fragment.—*Boston Med. and Surg. Jour.*, Dec. 2 and 9, 1886.

#### ULCERS, TUMORS.

**I. The Cure of Large Ulcers of the Leg by the Carbolyzed Spray.** By GILLES DE LA TOURETTE (Paris). This paper presents in detail three cases of stubborn ulcers of the leg in inmates of the *Infirmierie des Incurables* connected with the service of Charcot. The general condition of the patients was of the worst description. The first was an extremely debilitated and emaciated subject of asthma conjoined with chronic bronchitis, 69 years old, presenting an enormous ulcer covering the whole right leg, from the malleoli to within an inch of the tuberosity of the tibia. The carbolic spray for an hour and a half morning and evening, with intermediate dressing with borated vaseline, caused a complete cure in less than a month. The second was an ulcer, 18 centimeters high, covering the lower half of the leg in a patient 82 years of age, feeble and senile and the subject of chronic bronchitis. Carbolyzed spray for two hours twice a day with borated vaseline dressing in the intervals, secured a complete cure in about six weeks. The third case occurred in a syphilitic subject, with mitral insufficiency, tertiary syphilis and chronic bronchitis, aged 59, with a vast ulcer, 22 centimeters long, enveloping the whole leg. Carbolic spray applied during the next six months had brought the ulcer down to about the size of a six sous piece when the patient died by



his own hand. As the result of his observations, the author concludes :

*a.* The method of carbolic spray repeated daily for an hour and a half, morning and evening, better than any other method leads to a rapid cure of large varicose ulcers. *b.* In the early part of the treatment, the pains seated in the ulcer disappear. In the three cases observed, no erythema ever appeared at the margin of the wound, nor did, the patient ever void the black urine indicating carbolic poisoning. *c.* A state of debility or senility of the patient does not in any way contraindicate the employment of the method, which, on the contrary, by the local stimulation, which it determines, seems formally indicated in this particular case. *d.* The solutions used are the stronger, as the ulcer is the more atonic ; solutions less than 1 to 50 should be rejected and even the greater strength,  $\frac{1}{30}$ ,  $\frac{1}{20}$ , or even  $\frac{1}{10}$  could be used. In the interval between the applications of the spray, the dressing of borate of soda and vaseline, 1 to 10, will be found useful.—*Revue de chirurgie*, July, 1886.

**II. The Treatment of Anal Fistula Associated with Phthisis.** By E. E. GLOVER M. D., (Terre Haute, Ind.). This paper is a résumé of the opinions of a considerable number of American surgeons obtained in answer to a series of questions propounded by the author, and reflect, he believes, the prevalent opinions of the profession in the United States. 1. Operative interference is advised and practiced with benefit to the patient, excepting (*a*) where the cough is constant, unless this be first allayed ; (*b*) where the pulmonary disease is either rapidly advancing or is far advanced ; or (*c*) where the reparative powers of the patient are so low that they are evidently unequal to the task of healing the wound. 2. Although it is proper to operate during any season, preference should be given to pleasant weather, such as will allow the patient to be in the open air. 3. Where the tissue surrounding the fistulous track is supposed to be tubercular, some advise its removal by the knife or sharp spoon. 4. The wounds heal in nearly every case in which an operation is justifiable. There should be as little interference with the sphincter muscles as possible. 5. The suppression of the discharge is supposed to be positively beneficial. It is recommended by some that where the discharge is supposed to have a beneficial derivative effect, a seton be inserted in the

arm or other eligible part before operating on the fistula. 6. It is believed that a successful operation tends to retard the progress of the disease and to prolong the life of the patient.—*Jour. Am. Med. Ass'n.*, Nov. 20, 1886.

J. E. PILCHER (U. S. Army)

**III. Cases of Echinococcus in Man.** By Dr. A. E. FICK (Richmond, Cape-Colony). No cases of echinococcus having been reported from Africa (with the exception of those described by Bilharz), the author believes his to command a certain interest.

From July, 1879, to January, 1886, he saw nine cases, only five of which, however, were treated by operations, and the diagnosis thus verified.

From his experience he draws the following conclusions :

1. The presence of albumen in the fluid of a cystic tumor does not preclude echinococcus.
2. Tapping is to be entirely discarded as a mode of treatment, because the dangers connected with it are considerable, and because the radical operation, in case it should subsequently become necessary, is thereby rendered much more difficult and dangerous.
3. Aspiration for diagnostic purposes should be limited to a small amount of fluid, at most to 50 cc.
4. The dangers connected with the radical operation of non-suppurative cysts consist principally in failure to remove parts of the echinococcus, even when the abdomen is opened. Entrance of the fluid into the abdominal cavity is comparatively harmless. The incision should, therefore, if possible, be made sufficiently large to admit the whole hand into the cyst, in order to completely empty it.
5. Operation should consist in incision (a) whenever the cyst is small and superficially situated, so that the operation may be easily completed and the recovery rapid; (b) if the presence of the cyst interfere with the patient's occupation. Not easily operable cysts causing no special inconvenience, should not be interfered with, since it ap-

pears to be not uncommon that echinococci spontaneously perish, break down, and shrink.

The cases are in short as follows :

I. Boy of 12 years, presenting an hepatic tumor reaching to the crista ilii, and causing moderate inconvenience. Diagnosis confirmed by another physician. Some years later patient was seen again, when the tumor had entirely disappeared.

II. Girl, æt. 12, colored ; very large tumor of liver, taking up the whole right side. Hydatid cyst diagnosed, and unfavorable prognosis made. Patient at present healthy and strong, with no trace of tumor.

III. Strong man, 40 years, presenting a tumor of liver, troublesome at times. Echinococcus diagnosed, but operation not advised, as the tumor did not increase in size. (None of these cases were operated upon).

IV. Elderly farmer, seen only once ; presented a fistula under right costal margin, which secreted pus and admitted a catheter for 10 or 15 cm. Diagnosis: Remnant of hydatid cyst.

V. Young man, æt. 16, suddenly attacked with pain in right lumbar region ; subsequently pains in bladder and hip. Urine contains small echinococcus-cysts, the size of a pea.

Incision (Dr. Hohmann) parallel to margin of quadratus lumborum muscle ; numbers of cysts evacuated. Recovery said to have lasted four months. At present healthy condition.

VI. Child, æt. 4. Tumor of left lobe of liver, fluctuating. Diagnostic aspiration vented 50 cc. of non-albuminous clear liquid, in which no scolices were found. Temperature next day 40° C., attributed to a dulness in apex of right lung, reaching to second rib. As blood was expectorated from time to time, the diagnosis of pulmonary echinococcus was made. Treatment with tincture of Kamala, 30 drops, three times a day, an operation not being permitted.

VII. Man, æt. 29. Had been tapped for a tumor occupying the left hypochondriac region, reaching to within 2 cm. of the iliac crest. Cardiac dulness continuous with that of tumor. Incision through upper part of left rectus abdominal muscle (where previously tapped).

The spleen only presenting here, another incision at right angles was added. Cyst found and stitched to abdominal wound; suture of rest of wound. Incision of sac; irrigation with carbolic acid 2 %. Counter-opening made for insertion of drainage-tube into sac. Reactionary temperature, 38.6°. Abdominal incised wounds healed by primary intention. Contents of sac, however, became putrid. On 9th day 40.0° C. Sac cleaned out, but fever continued for four weeks, and recurred when patient got up. After six weeks recovered, but fistula remained. One year later, in endeavoring to close the fistula, communication was accidentally established with colon, but finally total recovery was achieved. At present patient suffering from catarrh of apex of lung.

VIII. Girl, æt. 21, first noticed symptoms of disease four or five years previously. \* Scoliosis. Hepatic dulness 23.5 cm. in the line of right papilla. Diagnostic aspiration reveals a clear, albuminous fluid. No scolices. Reactionary rise of temperature, and pain with tympanites for six days. Operation September, 1885. Incision. Suture of liver to edges of wound; partial evacuation of cyst; further row of sutures; incision into cyst through covering layer of liver-tissue; hæmorrhage; third row of sutures. Dressing of iodoformized gauze, dry sublimated cotton and borated bandages. On the following days vomiting. Temperature, 38.5° C. Pulse 120. Cyanosed lips. Antipyrin. After two weeks fever had risen to 40.0° C. No putrefaction of cyst, the parts of which came away for the next five weeks. After third month only a fistula remained, which is expected to close in another month. Patient doing well.

IX. Girl, æt. 22, presenting an hepatic tumor, of moderate size. Aspiration of 500 cc. of clear albuminous liquid, containing scolices. On following days abdomen painful, somewhat distended. Temperature 39.5° C. In three weeks dismissed improved. After four months patient was seen again, in bad general condition, and complaining of severe pain and some fever. Diagnostic aspiration produced pure pus. Reactionary temperature 40.0° C. Pulse 120. Incision between ninth and tenth rib. No pus found.

Wound closed again with sutures, healed by first intention. After one week fever returned, but subsided after some further weeks, and patient began to improve in health. Was dismissed after one month. —*Deutsche Zeitschr. f. Chirurg.*, Vols. 24, 3 and 4. Heft 25, August, 1886.

W. W. VAN ARSDALE (New York ).

Several of the calyces were the seat of abscesses containing phosphatic substance. The capsule separated readily. Of the right kidney, almost the whole of the renal tissue was destroyed, only a little of the pyramids was left and a thin layer of the cortex, in which were several small cysts. The interior of the sac thus formed was occupied by a yellowish, putty-like substance as of old pyo-nephrosis dried up. There was no calculus in it. All the other organs were quite normal.

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## ON THE USE AND THE ABUSE OF PASSIVE MOTION.<sup>1</sup>

BY HENRY B. SANDS, M. D.,

OF NEW YORK.

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I AM induced to bring before the Society for discussion the well-worn but important subject of passive motion, in the hope of putting it, if possible, on a broader and more scientific basis. So many claims are made in its favor, which seem to me to be unfounded, that I think it desirable to state just what amount of good may be expected from it, and in what class of cases the method is unsuitable. I approach the subject with some hesitation, because I am apprehensive that my opinions will encounter opposition. I shall present, however, little more than the results of my own experience; and I entertain some views which I should be glad to alter, provided I could find other ones supported by credible testimony.

The phrase passive motion may appear to be somewhat ambiguous, as the word passive implies merely that the patient either offers no resistance to manipulation, or that the resistance offered to manipulation is overcome. On the other hand, the movements made by the surgeon are always active, and sometimes very forcible. A degree of severity, therefore, may belong to the procedure, which the term is not adapted to convey.

<sup>1</sup> Read before the New York Surgical Society, Dec. 27, 1886.



Concerning the common form of injury known as a sprain, which most often occurs at the ankle, it may be remarked that various lesions are doubtless included under this designation. In slight cases the ligaments are, perhaps, only severely stretched; in bad ones they may be more or less completely torn. Subcutaneous extravasation of blood is usual, and occasionally hæmorrhage takes place into the adjacent joints and tendinous sheaths. In a few cases the parts continue weak and painful for a considerable, or, it may be, an indefinite period; while in a still smaller number the foundation is laid of serious organic disease.

In no form of injury do wider diversities of opinion exist regarding treatment than in that called sprain. The old-fashioned treatment, which prescribes rest and fixation of the sprained joint, is preferred by some; while wonderfully good results are declared by others to proceed from the early employment of massage, combined with passive motion, and the almost immediate use of the injured parts. As in many other instances, the truth here probably lies between the extremes. My own practice has generally been conservative. Unless the injury is of trifling degree, rest and immobility would seem to be instinctively, if not imperatively, demanded. By rest and immobility an opportunity is afforded for a reunion of the ruptured parts, while the pressure of a bandage favors the diffusion and absorption of blood, serum, and other extravasated fluids. When it may be reasonably presumed that the injury has been repaired, usually after the lapse of from one week to two weeks, passive motion has seemed to me useful by preventing or removing stiffness or pain. Aside from tuberculous disease of the joint, which may undoubtedly arise in consequence of this form of injury, I have often known the use of a badly sprained ankle to be followed by a long-continued lameness and pain. I am, therefore, inclined to be cautious, and to enjoin rest for perhaps an unnecessary period, rather than to recommend motion which might be premature. Massage and passive motion I have found most serviceable in recent sprains of mild degree, and in cases of stiffness resulting from old adhesions or prolonged disuse. In such instances I have wit-

nessed excellent effects from these remedies, but I am disposed to look with distrust upon active treatment applied to recent strains at all severe. I have been reminded by Dr. Wm. G. LeBoutillier, lately my house surgeon in the Roosevelt Hospital, that a favorite method there, when the sprain is not severe, consists in the immersion of the injured foot for several hours in hot water, and the subsequent application of a firm bandage. Under this treatment many patients are enabled to leave the hospital, walking tolerably well, at the end of three days.

After the reduction of dislocations I have rarely found it necessary to employ passive motion. I have usually kept the injured parts quiet by means of a sling or a bandage for a period varying from a week to a fortnight, and have then encouraged the patient to resume the normal movements. In a few instances, after reducing dislocations of the shoulder, I have been obliged to use considerable force in order to break up adhesions which had formed outside the articulation, in consequence of inflammation caused by the primary injury.

Experienced surgeons are divided in opinion regarding what mode of treating fractures is least likely to be followed by stiffness. Verneuil maintains that immobilization never induces ankylosis, but tends to prevent it by averting inflammation. Other surgeons are so apprehensive of causing, by immobilization, a loss of movement, that they renounce almost entirely the use of splints, and practice passive motion very early. Both parties claim that they have obtained good results; and, without pretending to be dogmatic, I desire to state my own views as founded on personal observation.

In the first place, cases of true ankylosis must be extremely rare. The only examples of the kind I can recall are those in which comminution had taken place of the bones composing the ankle- or the elbow-joint, which had become fused during the process of repair. Provided a fracture is simple, comminution, however extensive, is not very likely to be followed by ankylosis; and, at the present day, with suitable antiseptic treatment, such a result should be infrequent, even when joint fractures are compound.

But, if true ankylosis after fracture is rare, stiffness from false ankylosis is less uncommon, and, if incurable, may greatly diminish the usefulness of a limb. Its nature and causes are various. Undoubtedly it may occur in joints from simple disuse. I remember an example of the kind which I met with many years since, while I was serving an apprenticeship in the Bellevue Hospital. A woman broke her left femur at about its middle three times in the course of eight months. During the whole of this period she was kept in bed, with the limb maintained in a straight position by means of a weight attached to the foot. Meanwhile the knee, which was remote from the seat of fracture, became so rigid that, even with the aid of an anæsthetic, only the slightest motion was possible. She was dismissed with a stiff joint.

That organic changes occur in such cases cannot be questioned. Shortening and rigidity of the capsule have been conjectured to exist, while distinct pathological conditions have been described by Bonnet<sup>1</sup> and Tesser,<sup>2</sup> who found, on post-mortem examination, or on inspecting limbs which had been removed by amputation, effusion of blood within the affected joint, undue redness of the synovial membrane, newly formed connective tissue uniting opposed articular surfaces, and swelling, erosion, and adhesion of the articular cartilages. Moreover Menzel<sup>3</sup> has shown by experiment that in animals, swellings, hyperæmia, and pterygium-like affections of the synovial membrane, and degenerative changes in the articular cartilages often take place in consequence of the enforced rest of a joint. Examples of the kind referred to may have been met with by every surgeon present, but they are seldom grave enough to cause serious apprehension. Furthermore, they are rare. As a rule, I have not observed that long-continued immobilization of a healthy joint gives rise to any stiffness which cannot be quickly overcome, either by passive motion or by the unaided efforts of the patient. The early restoration of the natural movements, and the absence of sharp inflammatory reaction when those are resumed, prove that no important lesions

<sup>1</sup> "Gazette médicale de Paris," 1841, pp. 609 and 625.

<sup>2</sup> "Traité des maladies des articulations." A. Bonnet, Paris, 1855.

<sup>3</sup> "Archiv für Chirurgie," *Ibid.* xii. 990.

have occurred. Nevertheless, the occasional sequel of obstinate stiffness suggests the propriety of watchful examination, and the avoidance, by timely passive motion, whenever necessary, of the injurious consequences that might otherwise ensue.

False ankylosis after fractures is usually dreaded when the fracture complicates a joint, or when it is situated very near to one. But I am satisfied that the danger in such cases has been greatly exaggerated, and that the stiffness, when it occurs, is often erroneously ascribed to the presence of morbid adhesions. In many examples of fracture at the elbow or at the ankle the subsequent limitation of motion can be traced to some bony displacement which happened at the time of the injury, and which was not accurately reduced. Or, as we have all noticed, the displacement may recur even after reduction has been accurately effected. Again, in some instances, a bony callus may impede motion by projecting into the interior of a joint. Impediments of the kind referred to are often discovered only at a late period, after the swelling of the soft parts has subsided. The ankylosis in the two first-mentioned sets of cases does not depend on the formation of adhesions, but on a faulty position of one or more of the bony fragments. It cannot be attributed to the long-continued wearing of splints, except so far as they may hide from view the existence of the impediment, and lead the surgeon to believe that things are right, whereas they are wrong. Whenever any such uncertainty is met with, therefore, I am in the habit of frequently examining the injured parts, and of resorting, if necessary, to such manual force as will restore the fragments to their proper position. Here passive motion will often be expedient, both as a test and a remedy; but it is not practiced with the intention of rupturing abnormal adhesions. At a later period, when consolidation has taken place, and motion is prevented by bony prominences, the ankylosis must be overcome, if at all, by some form of cutting operation. Passive motion, although often tried in these circumstances, would be obviously improper.

Adhesive inflammation, mainly periarticular, I believe to be the chief agent in producing the stiffness due to false ankylosis following fractures. Fortunately, this affection rarely occurs

to any troublesome extent when fractures are judiciously managed, and the broken bones are held in position by splints which do not exercise undue pressure. Accordingly, much stiffness of a joint seldom follows the usual treatment of fracture, which involves keeping the parts immobilized for three or four weeks.

Even after the patella has been fractured, and the knee has been confined in a straight position for a period of eight weeks, the joint is sometimes supple almost immediately after the splints are removed; and, without artificial assistance, will allow full flexion after the lapse of several months. Believing that adhesive inflammation is rarely severe after fractures in the neighborhood of joints, or extending into them, I have not feared the occurrence of ankylosis, but have generally avoided making movements before the consolidation of the fracture. So far as my experience goes, I have never had occasion to regret having followed this practice, and have never known ankylosis to result from it. Early motion, in my opinion, is very apt to be premature, and to cause the very stiffness it is intended to prevent. The case is different, however, when inflammation, denoted by pain, swelling and œdema, has actually set in. It may be argued that, at this period, the plastic material is soft, and that, by passive motion, the formation of adhesions, and the consequent stiffness, may be avoided. But even here my practice has nearly always been mild and conservative. By removing pressure, by keeping the injured parts at rest, and by making cold external applications, I have sought to control the existing inflammation and to limit the amount of fibrinous exudation. To anticipate one evil effect of ankylosis, however, I have in these cases been careful to place the joint, if possible, in such a position as would render the limb more serviceable in the event of subsequent stiffness. Passive motion I have seldom practiced under these conditions, because it has appeared to me that it might do harm. Indeed, while the parts are swollen and tender, motion is difficult and painful, and if perseveringly made, is liable, according to my experience, to cause an aggravation of all the unpleasant symptoms. On this point, however, I desire to speak with

some reserve, because I have very little actual knowledge concerning the effect of passive motion practiced under the circumstances described. I have found it to be extremely painful, and I have suspected it to be mischievous. This is all I am willing to say. After operations for correction of the deformity caused by Dupuytren's contraction of the fingers, and after plastic operations on the hand, I have usually resorted to passive motion within a week, and have thought the stiffness was thereby prevented. Now a similar rule may apply to fractures when threatened with ankylosis; but I have had no experience which would convince me that such is the fact.

In common with many other surgeons, probably, I have met with stiffness most often after fractures of the lower end of the radius. I have seldom seen it except in persons who had passed the middle period of life, and I have never known it not to be preceded by signs of inflammation, which I believed to be adhesive in character, and to involve especially the sheaths of the tendons in the neighborhood of the wrist. Certainly, the stiffness which occasionally follows is due rather to adhesion of the tendons than to any affection of the joints. The liability to this unfortunate occurrence has led some eminent surgeons to discard altogether the use of splints in the treatment of these fractures, and to seek to prevent stiffness by an early resort to massage and to active and passive motion. I am not prepared to condemn such treatment entirely, or to deny that it may sometimes be expedient. But I am unwilling to believe that it is usually either necessary or safe. Some of the worst results I have witnessed have followed a neglect to fulfil the ordinary indications to reduce the displacement, and to maintain the reduction by the application of suitable splints. Not only deformity, but also loss of motion, may follow such neglect; and I am sure that a proper reduction of the fragments will go far toward preventing the occurrence of inflammation, on which the stiffness ultimately depends. It can be conclusively shown that immobilization of the injured part may be usually enforced for a long time without giving rise to ankylosis. At the Roosevelt Hospital, where many fractures of the lower end of the radius are treated, the plan adopted is



to reduce the displacement at once as far as possible, and to apply two straight wooden splints, which extend along the forearm and the hand, but not so far as to impede the movements of the fingers. These splints are occasionally removed for the purpose of examining the parts, which are otherwise allowed to remain undisturbed for a period of four weeks. The splints are then dispensed with, when the bones are found to be firmly united, the freedom of motion being only slightly impaired. The results thus obtained are excellent, and the normal movements are soon regained.<sup>1</sup> Two hundred and twenty-seven cases have been treated according to this method during the past three years, and only one case has terminated in permanent stiffness.<sup>2</sup> It may be fairly maintained, therefore, that, as a rule, these fractures can be successfully treated without resorting to early passive motion. Moreover, the fact that such fractures commonly get well without stiffness, when the surgeon early begins passive motion proves nothing in favor of it, because they might have recovered equally soon if this had been omitted. But we must admit that stiffness now and then occurs; and the problem to be solved is how this can be obviated. I frankly confess that I am unable to offer, under all circumstances, a sure remedy. When the patient is old and rheumatic, the injury severe, and the inflammation active, I believed that stiffness may follow, whatever plan of treatment is pursued. I should be careful in such a case to remove all pressure of splints which might increase the existing inflammation, and to combat the latter by rest, elevation of the limb, and by making cold applications to the tender and swollen parts. Passive motion I should defer until the acute stage had subsided. An early resort to the latter method while active inflammation is in progress, I have never dared to prescribe, fearing that it might cause harm. If I could be convinced from the experience of my colleagues that such a practice was

<sup>1</sup> I am indebted for these statistics to Dr. Geo. S. Huntington.

<sup>2</sup> The patient referred to was a man who was treated in the usual manner, after the accident. He remained away from the hospital, contrary to instructions, for a period of three weeks; when he returned, his wrist was found to be stiff. No further particulars are contained in the records.

beneficial, instead of injurious, I should be glad to change my present opinion, and to renounce the plan of treatment which I have found generally, if not uniformly, successful.

I can speak much more positively and favorably respecting the efficacy of passive motion in promoting convalescence after fractures, by removing what are called their residua—namely, swelling, stiffness, and pain in attempting movement. Often, it is true, these symptoms are not very marked, and will disappear entirely if the patient is encouraged to use the limb. But when they are decided and persistent, and when the natural movements are shunned on account of pain, indolence, or timidity, the value of massage and passive motion is unquestionable. When practiced daily, or every second day, such treatment will frequently cause rapid improvement, by rendering the circulation in swollen parts more active, by dissipating the swelling, which is usually due to passive œdema, and by making motion easy and painless. As every surgeon knows, patients who have suffered from fractured limbs are often reluctant to use them, even after the bones are firmly united; and it is in this class of cases that friction and passive motion are so valuable. Not infrequently, indeed, physicians, as well as patients, are deceived by the idea that the symptoms are indicative of inflammation which requires rest; and for this reason patients are sometimes disabled for a long period, and possibly treated for rheumatism or for some other disease which does not exist. A few active manipulations will reveal the error in diagnosis, and not seldom accomplish a cure. The sudden disappearance of pain on motion which is occasionally noticed in these cases, can hardly be otherwise explained than by supposing that abnormal bands or adhesions have been forcibly ruptured. Whatever be the rationale of the treatment referred to, there can be no doubt that it is eminently successful.

In a small number of cases of stiff joints following injury, or dependent upon long-continued fixation of a limb, I have derived great advantage from the employment of an anæsthetic. The absence of pain and of muscular contraction thereby induced, facilitates the necessary movements, and oc-

asionally affords valuable aid in diagnosis. As a rule however, anæsthetics may be dispensed with, and, furthermore, repeated movements are commonly needed to obtain the desired result.

I possess no personal knowledge of cases of slipping or adhesion of tendons, or of mysterious or unexplained lesions which, having resisted the ordinary means of treatment, have been brought to speedy recovery by the rough handling of bone-setters, and I believe that most of the statements made regarding their achievements are, to use a mild term, inaccurate. I am incredulous and suspicious of all marvellous cures, whether claimed to have been wrought by bone-setters, or by orthodox members of the medical profession.

I have met with little or no success when applying passive motion for the purpose of overcoming the firm contraction of the skin and deeper tissues which follow burns and other injuries accompanied with much loss of substance. The limit of stretching of which scars are capable by passive motion is soon reached, and further attempts to extend them are quite liable to cause rupture.

The value of passive motion as a means of overcoming ankylosis due to disease not caused directly by injury, is a subject which admits, perhaps, of but little discussion. But there are some facts relating to it which should be distinctly stated, and there are some errors prevalent, which should, I think, be corrected. Among the severer affections of the kind referred to, I have found most amenable to treatment cases of stiffness of the shoulder, apparently unconnected with disease of the joint, but dependent upon the pressure of adhesions in the large bursa situated beneath the deltoid muscle. This disease, which has been well described by Duplay, has many features resembling those due to arthritis, from which, however, it is not hard to distinguish. But the movements of the arm at the shoulder-joint may be limited and painful, and the usefulness of the limb nearly lost. I have encountered many such cases, and have invariably succeeded in affording relief by the employment of passive motion. This I have always practiced after administering an anæsthetic, and I have sometimes been

compelled to resort to considerable force in order to overcome the resistance. The adhesions, wherever situated, usually give way with an audible sound, and the freedom and extent of motion are completely, but sometimes only temporarily, restored. By the subsequent use of passive and of voluntary motion, and by repeating the manipulations while the patient is under ether, if necessary, I have seldom failed to obtain a complete and permanent cure.

Unfortunately, I am unable to record equally good results from the treatment by passive motion of any other form of ankylosis, if I except certain cases of hysterical muscular contraction, which may be dismissed with this bare allusion. Most often I have had occasion to employ passive motion with the simple, but important object of putting the diseased limb in a suitable position. Even before such an attempt is made, however, discrimination and caution are sometimes necessary. Probably most surgeons would agree that, when true bony ankylosis exists, passive motion should not be made to correct the deformity, which should be dealt with, when necessary, by the use of the knife and the saw. Passive motion may also fail to alter the position which a limb has assumed in the course of tuberculous arthritis of long standing. When, in old hip-disease, the thigh has become much flexed and adducted, forcible motion, intended to secure a straight position, is at least a doubtful expedient. It will probably turn out to be unsuccessful, because the soft parts will be found so contracted and rigid that nothing short of actual violence will cause them to yield enough to permit a correction of the deformity, which, moreover, may be further maintained by bony alterations impossible to anticipate or overcome. Again, the employment of much force, in such circumstances has often been known to set up severe inflammation, with even fatal consequences. Excision, therefore, although apparently a harsher remedy, would seem to be preferable, as involving less danger, and obtaining a better and more definite result. Similar remarks may be made respecting the knee. When, in consequence of old joint disease, the leg has become flexed and rotated outward, the head of the tibia partly dislocated backward, and the soft

parts behind the joint contracted, any attempt to straighten the limb by passive motion, even when preceded by tenotomy of the hamstrings, will be futile, and the end in view can be gained only after a formal excision has been performed. But, in the early stage of arthritis, whether tubercular, gonorrhœal, rheumatic, or of other origin, a bad position can always be safely corrected by manual force, aided by an anæsthetic, when necessary, and thereby, in the event of ankylosis, one of its most disastrous consequences can be prevented.

For the purpose of restoring movements which have been impaired or lost from the occurrence of firm false ankylosis of the joint from whatever cause, or for the removal of stiffness dependent on the firm adhesion of tendons to their synovial sheaths, my results, after many trials of passive motion, have been so discouraging that I now seldom advise this mode of treatment as a means of cure. As, however, the exact amount of resistance to be overcome, and the exact pathological condition cannot be settled beforehand, I almost invariably, when consulted in cases of the kind referred to, advise the administration of ether, and the trial of a fair amount of forcible manipulation. But, if the adhesions are numerous and firm, and great force is required to re-establish mobility, I have found that even when the movements become very free and extensive at the time of operation, they are lost again almost immediately afterward, the stiffness returning, and being as bad as before. It is often said that, in these cases, failure is due to a neglect, on the part of the surgeon, to maintain the advantage already gained by the continued practice of passive motion. But I am convinced that this assertion is untrue. So much pain, swelling, ecchymosis follow the first attempts to move the stiffened parts, that for a day or two afterward they must be allowed to rest; and when inflammation has abated sufficiently to warrant a repetition of passive motion, the whole thing has to be done over again, and with the same result. My experience with this method in such cases has been so uniform, that I cannot doubt the correctness of the opinion I have expressed. I recall an instance in which a man, who once consulted me, was treated in the manner I have described; and, al-

though, at the time of the operation, the leg, which was at first extended, could be well flexed, the stiffness soon returned, and was as marked as ever. I kept the man's leg extended during his convalescence, and then advised him to let it alone. But he fell into the hands of an enterprising and enthusiastic surgeon, who promised to cure him, and who afterward boasted that he had done so. I finally caused an inquiry to be made about the patient, and ascertained that the joint had soon become again immovable.

To sum up what I have said, I am not an advocate of passive motion, except under the restrictions which I have endeavored to define. I believe that when practiced without discrimination, it will often be unsuccessful, and sometimes injurious, by inducing or increasing inflammation. I am certain that the severer forms of ankylosis and of fixation of tendons are frequently due to this disease, and that the inflammation will be aggravated by employing passive motion before the active symptoms have disappeared. The idea that motion will always prevent ankylosis is a fallacy which is contradicted by common experience. I have performed the operation of excision of the elbow for the cure of true ankylosis, and I have seen such operations performed by others, during which, perhaps, too little bone was taken away; and, in spite of the early and diligent use of passive motion, the stiffness has returned, bony consolidation has recurred, and the operation of excision has had to be repeated. But motion may even be successfully employed as a means of causing a bony deposit to take place. It is a well-known fact that, in many instances of ununited fractures of the thigh or of the leg, bony union may be determined by the inflammation which is set up by making forcible motion of the fragments, or by causing the patient to walk about upon the injured limb, with the view of pressing them against each other. On the other hand, by operating according to modern antiseptic methods, which tend to prevent inflammation, partial excisions of even so intricate a joint as the elbow may sometimes be performed without any impairment of its mobility.

I have brought the subject of passive motion to the attention



of the Society, because it is one of great practical importance, about which surgeons are frequently consulted, and about which there may be honest differences of opinion. What I have stated here is the result of my own experience; but, as I mentioned in the beginning, I should be glad to change some of my present views, if others could be advanced which were sustained by evidence that appeared to me to be clear and trustworthy.

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## PLASTIC OPERATION FOR CLOSURE OF A LARGE LARYNGEAL FISTULA.<sup>1</sup>

By ROBERT ABBE, M.D.,

OF NEW YORK.

SURGEON TO SAINT LUKE'S HOSPITAL.

IN December, 1885, a man æt. forty-five years, presented himself for treatment of an opening in the side of his larynx immediately above the vocal cords, into which the end of one's thumb could be thrust. In the month of April preceding, he had tripped while rising from his cobbler's bench with a shoemaker's knife in his hand, and had so stumbled that he fell upon the point of his knife, which was thrust well into the thyroid cartilage of the left side. It was an ugly gash and bled severely. He was carefully treated in the Bridgeport hospital at once, a tracheal tube was inserted and, he says, was worn a month. The hole in the cartilage was just above the vocal cord attachment, and laryngeal inflammation probably followed and impaired his breathing. After another month an operation was performed to close the fistula by suturing, but was ineffectual.

He then came to New York and was subjected to five more attempts at closure by his physician at home. The methods varied: Sometimes silver wire sutures were used, after paring the edges; sometimes, silk. Twice were the harelip pins and figure-of-eight suture used. But after each operation mucus and discharges burst the wound open and left him more desperate than before. The successive parings of skin and cartilages had resulted, with what ulceration occurred be-

<sup>1</sup> Reported to the New York Surgical Society, Dec. 22, 1886.

tween times, in the sacrifice of a considerable portion of the left lateral half of the thyroid cartilage, the entire gap being nearly three-quarters of an inch, though the opening in the cartilage proper was five-eighths of an inch in diameter. The edges of the fistula were cicatrized, and induration extended half an inch from the opening. Through this great gap one could get a most extraordinary view of the vocal cords in action. The anterior ends were attached just within the lower edge of the fistula on the median side, and when

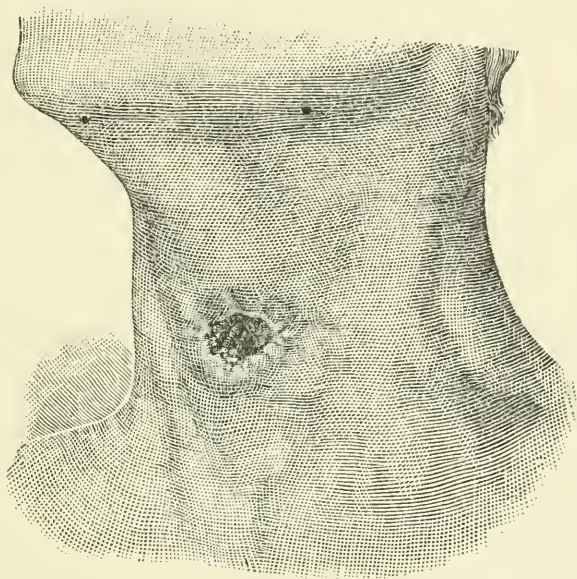


FIG. 1. EXTERNAL APPEARANCE OF LARYNGEAL FISTULA.

at rest the cords fell flat on either side and were lost in the mucous membrane. On attempted phonation they sprung into view and vibrated at an angle of thirty degrees with the horizon—afterward falling back to nearly the horizontal position.

The movement of the cords to assume this angle with the horizon when the patient is erect I do not find noticed in such authors as I have consulted.

Attempts to speak or make audible voice when the fistula was uncovered were futile. The voice being produced in the mouth and pharynx by the utilizing of sound of vibrating cords, it was vain for him to try to phonate when all the sound escaped from the side of the lar-

ynx. All he could do was to produce a fizzing or buzzing note like the sound one might make by blowing through a single reed of an organ. When, however, a flat pad covered the fistula, he could phonate perfectly, though with a slightly husky tone.

I decided that by the following not very complicated plastic operation I could close the fistula, if I did preliminary tracheotomy to prevent expulsive efforts at coughing from forcing mucus and air through the sutures.

November 13, 1885, assisted by Dr. Bangs, the patient was etherized

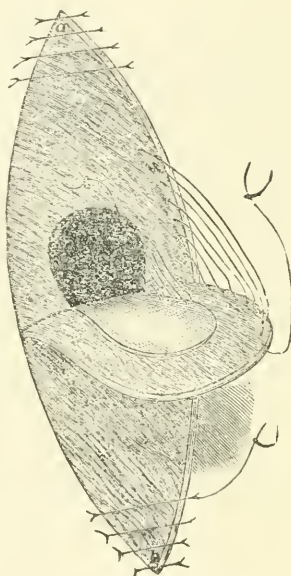


FIG. 2. FLAP READY FOR SUTURING.

and tracheotomy done at the two upper rings. When the patient breathed well through the tube the glottis was stopped through the fistula with a sponge attached to a string drawn out through the mouth. The edges of the fistula were thoroughly pared. A broad elliptical space was then included between two incisions, *a*, *b*, being somewhat wider than the fistula and extending obliquely downward on the patient's neck. A part of the included skin below the fistula was dissected up so as to make a flap on its upper edge, which, when turned over, more than covered the hole. The cuticle was then denuded from the part of this surface not wanted to cover the hole, and the rest of

the elliptical space made raw for the reception of the overturned flap. The latter was then stitched over the fistula by two rows of fine continuous catgut: one row on the edge of the orifice tacking the surface of the flap at the circle of denudation, and the second on the outer edge of the flap fastening it to the outlying tissues.

The skin on either side of the neck was then undermined and slid over the flap mentioned, so as to meet directly over its centre. A lateral slash,  $1\frac{3}{4}$  inches away, was necessary to relieve tension, and served to admit a drainage tube.

Antiseptic compresses were applied and the sponge removed from the larynx by the mouth. The patient made a very comfortable recovery with primary reunion throughout. The tracheal tube was removed on the fifth day, and he was allowed to talk at the end of a week. He left the hospital with a perfectly solid larynx—and excellent phonation, which has been maintained.

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CASE OF RUPTURE OF GALL BLADDER: CHOLE-  
CYSTECTOMY: SUBSEQUENT OBSTRUCTION  
OF COMMON BILE DUCT BY OVER-  
LOOKED IMPACTED CALCU-  
LUS: DEATH.

By ARCHIBALD DIXON, M.D.,

OF HENDERSON, KY.

ON the night of August 20th, 1886, a white male, æt. 32, while in a state of intoxication, fell from the third floor of a hotel to the cellar, through the shaft of the elevator. He was taken up in a comatose condition and carried to his room, where I found him a short time after the accident. He had rallied somewhat, but was vomiting and suffering profoundly from shock, with some symptoms of concussion—a hypodermic of morphine,  $\frac{1}{8}$  gr., and atropia,  $\frac{1}{120}$  gr. was administered, and in a short time he had sufficiently revived to be able to speak. He had no recollection of having fallen through the elevator shaft, but complained of intense pain in the back and loins and over the right hypochondrium.

Examination revealed a dislocation of the ninth and tenth ribs of the left side, and fracture of the spinous process of the tenth dorsal ver-

tebra. The back, and the left lower extremity were badly bruised and contused, but no other fracture or dislocation was discoverable. On the morning of the 21st, the patient complained of abdominal pains, occasionally accentuated over the right hypochondrium—temp.  $101\frac{1}{2}^{\circ}$  with corresponding pulse of fair strength—slight tenderness over the abdomen, but not more than could have been expected under the circumstances. No material change occurred in his condition, until the morning of the 28th, when the temperature was found to be  $103^{\circ}$ —abdominal tenderness almost entirely confined to the right lumbar region, with moderate tympanites over the entire abdomen. A careful examination revealed a slight enlargement with dulness on percussion, a little to the right and above the cæcum. Thinking that perhaps I had a perityphlitis to deal with, and the sudden rise of temperature, accompanied by rigor, making it probable that pus had formed, an aspirating needle was introduced, and a quantity of red, yellowish fluid withdrawn, having much the appearance of bile. The question presented itself as to whether this fluid was composed of disintegrated blood and peritoneal serum, or was it bile. The solution of the question was arrived at by tasting the fluid, which was undoubtedly bile.

It was now evident that, in the fall, the patient had sustained a rupture of the gall-bladder, or of one of the bile ducts, with probable fracture of the liver, and the escaping bile had passed down along the posterior border of the ascending colon—extra-peritoneally—to the point of aspiration. An exploratory operation was decided upon and was made the afternoon of the same day (August 28), Dr. A. R. Jenkins assisting me.

An incision was made, after the method of Langenbuch, twelve or fifteen centimetres in length along the external border of the rectus abdominis; this was met by a second incision along the lower margin of the ribs—ten centimetres in length, extending towards the ensiform cartilage—the peritoneum was opened and a tumor of hyperplastic connective tissue, deeply tinged and saturated with bile, the size of a hen's egg, was brought into view—the gall-bladder was found completely collapsed and imbedded in this neoplasm which was underneath and external to the peritoneum.

The connection between the colon and the retro-peritoneal portion of the duodenum was broken up and the ducts exposed; the integrity of these was not destroyed, and a sufficiently careful search was, *presumably*, made for any stone or stones which might lie within them; none were found. The gall-bladder was now separated from the liver and it was found that the rupture was of such a character, as to render



extremely doubtful the chances of its successful repair and it was decided to remove the gall-bladder entire. Accordingly the cystic duct was ligated with heavy carbolized silk, and the gall bladder removed, partly by cutting and partly by the Paquelin cautery; the adjacent tissues were brought over the stump and stitched with carbolized catgut. The external wound was closed by deep peritoneal (catgut), and superficial sutures (silk), dusted over with iodoform and covered with cotton wool, a binder over all. It is unnecessary to go into detail, but it suffices to say that, the strictest antisepsis, so far as in our power lay, was maintained throughout, the peritoneal cavity being protected by sterilized sponges wrung out of warm carbolized water. The patient suffered much from shock and nausea, vomiting a dark grumous looking fluid—the nausea, in all probability, being largely due to ether—and did not fully react for over an hour. The patient did fairly well—temperature, morning after the operation,  $101\frac{1}{2}^{\circ}$ , and it did not reach above this point, until September 7, ten days after the operation, when it marked  $103^{\circ}$  in the evening. The dressing was removed on the 6th, and the wound found to have healed, *prima intentione*. On September 6, the day the wound was redressed, a slight diarrhoea was noticed, which had much increased on the 7th notwithstanding, active measures had been taken to suppress it. This diarrhoea was greyish in color, desquamative, slightly purulent and distinctly acholic in character, the actions, towards the last, becoming large and involuntary.

Slight icterus had been noted previous to the inauguration of the diarrhoea, which increased in intensity, day by day, until the patient was thoroughly and completely jaundiced. Death took place September 14, seventeen days after the removal of the gall-bladder and twenty-five days from the date of the accident.

The post-mortem was made nine hours after death by Dr. Jenkins and is given by him as follows :

Obductio cadaveris. Patient small of figure, intensely jaundiced and much emaciated. Inspection of abdomen showed a recently cicatrized wound, corresponding to that described in the foregoing text. Section from chin to pubes; connective tissue, fat and muscles of abdomen pale and anæmic. Abdominal cavity being opened, the intestines and omentum appeared anæmic. The former tympanitic in the highest degree. There was nothing abnormal in the quantity or quality, apparently, of the peritoneal serum, the entire cavity being guiltless of bile stain save at the point of wound. The omentum was adherent to the ascending colon and the small intestines on the entire



right side, by new hyperplastic tissue, and connected closely to the parietal peritoneum at the situation of the wound. Section through the cicatrized parietal wound revealed the catgut in situ and unchanged. The stump of the cystic duct was found lying as left, and encapsulated with bile colored hyperplastic connective tissue. Catgut unchanged. The ductus choledochus and hepaticus were greatly distended. The duodenum was laid open and pressure made on the distended gall ducts, with negative result; there was no coloration of the lumen of the gut by bile and the orifice of the common duct was with difficulty found. Just above the orifice a hard body was felt, contained within the duct, which on being opened permitted two calculi, the size of filberts, to be removed. The interstitium of the duct was callous and thickened by a connective tissue proliferation throughout its entire extent and appeared impassible to the stones, although the point of a small myrtle leaf sound passed below into the gut, the condition simulating, in a marked degree, callous stricture of the male urethra. One ulcer (*ulcus decubitus*) marked the site of the foremost concrement. Section through liver showed deep bile staining of parenchyma, (icterus viridis), (individual cells were also stained), (slight *stanungs leber*). Colossal dilation of all gall ducts, both large and remote, containing a stringy, gelatinous fluid (hydrops duct. bilifer). Medium grade of nutmeg atrophy. No evidence of traumatism. Intestinal contents throughout grey, gassy and purulent, loaded with desquamative epithelium; the mucosa of the entire tract had the appearance of having been scoured. No ulceration. Slight grade of *nephritis parenchymatosa*. Several embolic (?) hæmorrhagic infarcti. Coagulative necrosis, (*arteriola rectæ* and cortex). The bile was found to have dissected down the ascending colon to the point of aspiration and below the cæcum into and through the fascia iliaca and transversa, around Poupart's ligament.

The section was made under unusual difficulties and no proctocol was taken, and this description prepared, for the most part, from memory."

The post-mortem revealed the cause of this jaundice by the obstruction to the common duct. As mentioned, in the foregoing, a *presumably* sufficient search was made within the gall bladder itself, and also along the ducts, for any stone or stones, but none were found. I now think that the calculi were within the gall bladder at the time of its rupture, and were, perhaps, forced out of it and down into the common duct, so far as to have been overlooked. I regret very much that the stones were not found and removed, thereby giving

the patient a much better chance for recovery. At the time the icterus made its appearance, the propriety of opening up the external wound, and, if possible, removing the obstruction to the flow of bile into the intestines was canvassed, but thinking the occlusion due to some inflammatory process which might possibly subside in a few days it was deemed best to wait. Getting down to the duodenal connection of the common duct, is a matter of more difficulty than would seem, and those who attempt it will, perhaps, realize the truth of the assertion. Experience is a bitter teacher, but she teaches well. Perhaps the most remarkable feature of the case was the fracture of the gall bladder and the escape of the bile along the posterior border of the ascending colon, *extra-peritoneally*. This was proven beyond a doubt by the post-mortem find.

## EDITORIAL ARTICLES.

### SCHUCHARDT ON THE INDICATIONS FOR THE EXCISION OF JOINTS AFTER GUNSHOT WOUNDS.

In a paper which is published in *Deutsche Zeitschrift für Chirurgie* for June, 1886, (Bd. xxiii, Hft. 56), Dr. Schuchardt, of Metz, staff surgeon, German army, discusses the indications for the excision of joints after gunshot wounds, in the light of the present state of operative surgery, and with respect both to primary and secondary operations. He considers first:

The difficulties opposing the general introduction of the antiseptic method of wound-treatment into the army service, which he states to consist principally in the necessity of procuring reliable and sufficient material, in training help in the antiseptic method, and in gaining sufficient time to perform all surgical interference with full antiseptic precautions.

Each of these three objections, the author believes, could be easily overcome in future wars, and suggests appropriate remedies. In discussing the question as to the indications for resection of joints in military surgery during war—he simply has to consider the question from the antiseptic point of view—since both coincide.

He first reviews the results attained in resections of the various joints during the different wars occurring since Langenbeck first advised the operation in 1848. All the various authors and their experiences are quoted and the indications proposed by each one, both in regard to primary and to secondary operations are given.

Respecting the general results of resection of joints previous to the introduction of the antiseptic system the author quotes Gurlt, who has collected 3,278 cases operated during four German and the United States war, and who was able to show that the mortality was very

large and that the final results were by no means such as to justify the expectations of the authorities who had recommended the operations. In the German wars, too, the secondary operations showed better results than primary ones, while the reverse was the case in the United States war. Many of the fatal results were due to pyæmic and septic infections, and the author believes that antiseptic precautions would prevent these.

Under antiseptic regime the incision wounds heal in two weeks, and thus earlier transportation would be made possible, as well as passive movements and other manipulations calculated to insure mobility in certain cases. However the formation of new bone is less copious under the antiseptic regime than formerly, which is a decided disadvantage, but one which is amply compensated for by the fact that the antiseptic regime admits of more conservative treatment.

The author next considers the published cases of gunshot wounds of joints treated antiseptically, especially those of Sies, Reyher, and six cases reported during peace from Volkmann's clinic. As the final result of those cases treated antiseptically during war (1877 in Roumania) could not be ascertained, a comparison with former ones cannot be made; but the author believes the results of exsections of joints antiseptically performed during future wars, need not materially differ from those now performed in times of peace.

He next quotes the views of ten prominent clinicians and military surgeons, in order to give some idea of the manner in which the operation of resection of joints is regarded in the present day. The majority are in favor of expectant and conservative treatment as opposed to resection. These views accord with Gurlt's statistics, which showed that primary resection was not attended with as good results as were secondary operations.

In order to explain this fact the author advances the opinion that primary resections are unsuccessful during war principally for three reasons. (1) The periosteum is more difficult to elevate in recent cases, than when suppuration has ensued: and but few military surgeons possess the practice and routine to perform this operation well. (2) In the noise and confusion of battle, and surrounded by a large

number of wounded crying for relief, it is impossible for the surgeons to possess the same repose and calmness as at home, which is nevertheless equally necessary to success. (3) In war it is frequently necessary to move the patient after operation. Transportation of wounded, in the author's opinion, is not so disastrous directly after the injury and before operative interference has been made, as afterwards.

Antiseptic practice cannot alter anything in these three points, whereas the more scanty formation of bone under antiseptic dressings forms a new disadvantage.

The author finally proceeds to establish the present indications for treatment of gunshot wounds of joints during war.

In case foreign bodies (bullet and pieces of clothing) have entered the joint, the joint should be laid open and the bodies removed under antiseptic precautions, provided that sufficient leisure is at hand, as is the case in war during sieges.

Under other conditions simple occlusion of the wound, by covering it with antiseptic dressing, without surgical interference of any kind, is indicated. If the joint has been perforated by the projectile in such a manner that both entrance and exit wounds are present, antiseptic occlusion should alone be employed.

The same treatment is indicated if extensive comminution of the bones have been caused; since ankylosis is preferable to a loose joint.

The diagnosis of comminuted fracture is not always easily made in injuries to a joint, since examination of the wound with the finger or with probes is not permissible; but it is also of secondary importance.

Delomre's observation, that in cases where the bone was injured the exit-wound was larger and more lacerated than the entrance-wound, while, if the soft parts alone were injured, both wounds (as also the laceration of the clothing), were of equal dimensions, may prove of use in making the diagnosis.

In case of extensive destruction of the joints by cannon-balls and other serious injuries to the large blood-vessels and nerves, primary amputation is indicated, which, moreover, frequently gives better results and shows a lower mortality percentage than resection.

Primary resection of the joints is therefore only indicated (1) if foreign bodies are known to have penetrated the joint and to be lodged there, and (2) free laceration of the joint by large projectiles, whether the bone be extensively injured or not.

In any case, however, the wound should be first covered by an antiseptic occluding dressing and the patient transported, before operation, to the field-hospital.

Secondary resection of joints is indicated when fever and other symptoms of septic infection appear in cases treated by the conservative method up to that time.

In order to secure better final results after joint-resections, the author recommends the early transportation of the convalescent patients to a central point where passive movements could be regularly made under the supervision of orthopædic surgeons.

Applying these general indications to the special joints the author sums up the treatment as follows:

Shoulder-joint; light gunshot wounds; antiseptic occlusion, with plaster-of-Paris bandage; severer wounds; the same with fixation of arm at an angle of  $45^{\circ}$  to the thorax; entire destruction of joint or septic disturbance after occlusion; free resection of joint.

The same rules apply to the elbow. In case of resection, the arm should be put up in an extended condition for four or five weeks and then bent at right angles, in order to insure firmer ankylosis.

Wrist. Primary opening-up of the wound; suture of all severed tendons, etc.; antiseptic dressings.

Hip, knee and ankle-joints. Primary occlusion. If septic trouble arises, resection of hip-joint; amputation above the joint for both knee and ankle, if ankylosis cannot be attained.

W. W. VAN ARSDALE



SENN. ON THE SURGERY OF THE PANCREAS.<sup>1</sup>

In an elaborate memoir presented at the 1886 meeting of the American Surgical Association, the author, Prof. N. Senn, has attempted to supply some data upon which to base rational methods of treatment for such of the injuries and diseases of the pancreas as may possibly be amenable to surgical interference. His work has included clinical researches and practical experiments, in the latter of which, dogs and cats were used exclusively. In all the experiments the most careful antiseptic precautions were carried out; the greater omentum was either pushed forward or, in the majority of cases, an opening was made into it by tearing at a point opposite the intestinal incision. The guide to the pancreas was always the pyloric orifice of the stomach. After the index finger had reached this point, it was passed along the duodenum for three or four inches, when the bowel was grasped between the index finger and thumb and brought into the incision with the pancreas.

*Wounds of the Pancreas.*—As the result of several experiments upon complete section of the gland, the author concludes that even when the ends are kept in accurate coaptation, complete section of the duct appears to result uniformly in the obliteration of the duct at the site of section. The obliteration is the direct result of the formation of a cicatrix in the lumen of the duct from the cut surfaces. The practical deductions are that in transverse visceral wounds of the pancreas, the most important indication that presents itself is to arrest hemorrhage by ligaturing the bleeding vessels, and to resort to suturing of the severed organ with a view to retain both ends of the pancreas as nearly as possible in their normal location, and thus maintain as nearly as possible the integrity of the vascular supply, rather than with a purpose to obtain restoration of continuity of the divided pancreatic duct, which, if it could be accomplished, would preserve the physiological importance of the detached portion of the gland. By detached portion of the gland is meant that portion which no longer remains in

<sup>1</sup>The Surgery of the Pancreas, as based upon experiments and clinical researches. By Nicholas Senn, M. D., of Milwaukee, Wis. *Transactions of the American Surgical Association*, 1886; also *International Journal of the Medical Sciences*

physiological connection with the intestine and which never regains its physiological importance after the duct has become obliterated by a cicatrix at the point of section.

In an experiment upon the result of laceration of the pancreas, the organ being torn completely across and dropped into the abdominal cavity, hæmorrhage was arrested spontaneously, and the process of repair, so far as the wound in the pancreas was concerned, appeared to be satisfactory, but death resulted from the accidental opening of the wound with prolapse, strangulation and gangrene of the duodenum.

It having been asserted by a number of authorities that dead pancreatic tissue is a highly putrescible substance, and on this account its presence is very liable to serve as a source of infection, the pancreas was crushed in two cats to test the correctness of this observation; one being in poor condition, died; but the other lived in good health until it was killed. In both instances the crushed parenchyma of the organ was promptly removed by absorption, which seems in this particular locality to proceed with unusual activity, an occurrence which can only be explained by the assumption that the peritoneum is active in the process. No infection took place and no evidences of putrefaction could be found. Should wound infection take place in cases of this kind, there can be no doubt that the dead pancreatic tissue would serve as a most favorable soil for the septic germs, and would thus create the most essential condition for a rapid and most dangerous form of infection. Subcutaneous crushing or comminution of the pancreas then is in itself not a fatal or even dangerous injury.

*Extirpation of the Pancreas, Complete or Partial.*—In six cases the entire pancreas was extirpated with a fatal result in every instance in from a few hours to nine days after the operation, the cause of death being either the primary effects of the traumatism, hæmorrhage and shock, or secondary pathological lesions traceable directly to the operation, peritonitis and gangrene of the duodenum. Contrary to the opinion of Schiff, in dogs and cats at least, this operation is necessarily fatal.

Partial extirpation of the pancreas implies a less degree of trauma-

tism, and consequently less danger of causing serious nutritive changes in adjacent organs than complete extirpation, and for these reasons it is less dangerous in a strictly surgical sense, although physiologically it may imply the same consequence as complete extirpation, as when the portion of the gland removed embraces the common duct or both principal ducts from each portion of the gland. Of four experimental operations, in two only the dogs lived for a sufficient length of time to determine the influence of the pancreatic secretion upon digestion and assimilation, the general health and nutrition remaining unimpaired for four weeks, when emaciation with fatty stools followed, which resulted in death from marasmus in one after seventy-six days, and reduced the second to a skeleton in one hundred and twenty-six days. These experiments would then tend to prove that the pancreatic secretion is an important, if not essential digestive fluid, and that in cases where no pancreatic juice can enter the intestine, or where secretion is entirely suspended, digestion and assimilation become impaired in all cases where the supposed vicarious action of other organs is inadequate to perform the functions of the extirpated or degenerated pancreas.

Fourteen experiments demonstrate the feasibility of ligature of either portion of the pancreas near the common duct as a surgical procedure, and the regularity with which the pancreatic tissue is removed by degeneration and absorption in the detached portion of the gland. After ligature of the duct or gland, secretion continues, and as the space for accumulation of fluid is limited, a certain degree of pressure within the duct is established, as is evident from the uniformity with which the ducts throughout that portion of the gland were found dilated. In no instance, however, was anything observed which resembled a cyst. The dilatation was not limited to any particular portion of the duct; it always presented itself as a uniform ectasia of the entire duct. We can only explain the moderate dilatation by assuming that, as soon as a certain degree of pressure is reached, the pancreatic juice is removed by absorption by the vessels and lymphatics of the pancreas, and that a greater accumulation of fluid and distension of the duct could only occur when this function has become diminished or suspended by or-

gamic changes in the structures which are concerned in the removal of the secretions. The atrophic changes in the parenchyma of the detached portion of the gland cannot be satisfactorily explained. Practically, this observation is of great importance, because it demonstrates that in operations upon the pancreas it is not essential or necessary to remove peripheral portions of the gland for fear that if any of the parenchymatous structures should remain, a retention cyst would follow. In partial resections for injury or disease, it would be advisable to ligature the peripheral portion, and permit it to remain, as it would lessen the danger by the infliction of less traumatism, and we can confidently expect that it will be removed in a short time by absorption. These experiments also settle definitely an important pathological question. It has been claimed by all writers that cysts of the pancreas are produced by obstruction of the common duct. In most of the specimens which have been examined, it is distinctly stated that obstruction was not complete, as for instance in cases of impaction of pancreatic calculi, when found in connection with cysts. In all of these experiments, obstruction of the duct was sudden and complete by elastic constriction, and subsequently permanent by the formation of a cicatrix between the divided ends of the duct. In none of the specimens, where life was sufficiently prolonged, did the process of obliteration fail to take place, and yet in none of them was even an attempt at the formation of a cyst observed. Experiments with the double ligature teach the importance of removing such portions of the pancreas as are not supplied with blood vessels, rather than trust to the doubtful expedient of leaving them to be removed by absorption, as dead pancreatic tissue is an exceedingly putrescible substance and furnishes the most favorable conditions for the growth and increase of septic germs.

Experiments made for the distinct purpose of studying the functional activity of a detached portion of the pancreas demonstrated conclusively that when a portion of the pancreas is detached by complete section, secretion continues until, by degeneration and absorption, the parenchyma of the gland has disappeared. That the atrophy in the part of the organ which had been detached from its connections with the intestines was not due to a traumatic interstitial

pancreatitis, is proved by the normal appearance and structure of the remaining portion of the gland which had retained its anatomical and physiological relations to the intestine, supporting the assertion that physiological detachment of any portion of the pancreas is invariably followed by degeneration and complete atrophy, consequently also by complete cessation of functional activity.

It is a well known fact that the pancreatic juice has an irritating action upon the skin, and eleven experiments were undertaken to discover its action upon the peritoneum; by the formation of internal pancreatic fistulæ. As the secretions often amount to more than four ounces a day in external pancreatic fistula, it is reasonable to believe that the same quantity was discharged into the peritoneal cavity and that in the nine healthy cases, two dying with purulent peritonitis, it was absorbed by the peritoneum. These, as well as the ligature experiments, corroborate the statement made by some authors that the introduction of normal pancreatic juice into the circulation is innocuous and that this abnormal supply is tolerated for two weeks or more without any appreciable ill consequences."

Of all abdominal organs, the pancreas is most exempt from injury, both from indirect and direct violence, a circumstance entirely due to its remote location and the ample protection furnished by the vertebral column and the bony walls of the chest. The anatomical relations of the pancreas with numerous and important organs are such that when this organ is injured, the same violence is apt to have wounded an adjacent and perhaps more important viscus. And the frequency of such grave complications with the profuse hæmorrhage usually attending such injury impart to wounds of the pancreas more than ordinary gravity. The author has collected thirteen cases of wound of the pancreas, eight of which were fatal. In not a single case did symptoms point first to this organ as the seat of lesion. If such a lesion is found upon exploratory laparotomy, it should certainly receive treatment. In case of extensive crushing, it would be good surgery to remove the crushed portion after preliminary ligature of the organ on each side of the comminuted portion. Ligature of the pancreas can be safely done with a single catgut or silk ligature as the fri-

able texture of the organ will permit of burying the ligature deeply, a circumstance which will guard against its slipping. If the pancreas is lacerated, each end of the organ should be ligatured for the purpose of arresting or preventing hæmorrhage, as well as to guard against extravasation of pancreatic juice into the abdominal cavity. Notwithstanding the favorable results of the exudation of pancreatic juice in the abdominal cavity in his experiments upon animals, the author considers that there can be no doubt that the presence of crushed pancreatic tissue and pancreatic juice in the peritoneal cavity after abdominal section, would greatly enhance the danger of traumatic infection, and for this reason, if for no other, the former should be removed and the escape of the latter prevented by ligature of the pancreas on the side or each side of the crushed or lacerated portion.

*Prolapse of the Pancreas.*—The treatment of prolapse of the pancreas will depend upon the pathological condition of the viscus at the time the patient comes under the care of the surgeon. If the prolapse is recent and the organ presents no indication of inflammatory or other changes, it should be thoroughly disinfected and replaced. It is of the greatest importance not to resort to violence in effecting reduction, as irreparable damage may be inflicted by resorting to more than the gentlest force. When reduction is not readily accomplished, the wound should be enlarged. If the pancreas is in a condition of inflammation or gangrene, the parts should be thoroughly disinfected and the organ pulled further into the wound until healthy tissue is reached, when a ligature is applied and the diseased portion removed with the knife or scissors. After another thorough disinfection, the stump is dropped into the abdominal cavity and the external wound closed. Thorough primary removal of infected tissue is the only safety against subsequent extension of the infection to the peritoneal cavity, and the only guarantee for primary union of the abdominal wound.

*Gunshot Injuries of the Pancreas*, when they come under the observation of the surgeon as an independent lesion or as a complication of other visceral injuries in case of penetrating wounds of the abdomen treated by laparotomy, should be treated in the same way as a contusion or laceration of the gland.



While the surgeon may unhesitatingly remove the tail and a portion of the body of the pancreas without fear of any immediate or remote ill effects, great care must be exercised in operating in the vicinity of the head, to preserve the integrity of the common duct and as much of this portion of the organ as may appear compatible with the condition which necessitates the operation.

*Inflammation of the Pancreas.*—Referring briefly to acute pancreatitis, he passes on to chronic interstitial pancreatitis or sclerosis of the gland, which sometimes produces stenosis of the bile-duct or the pancreatic duct and, when obstruction is followed by retention of the secretions, an operation always becomes necessary in biliary retention, which should be treated by establishing a new outlet for the bile into the duodenum, while the formation of an external pancreatic fistula in cases of cyst of the pancreas becomes necessary only when the presence of the swelling in itself has become a source of sufficient pain and discomfort to warrant treatment by abdominal section.

One of the terminations of acute inflammation of the pancreas is gangrene. Cases have been reported where spontaneous recovery followed elimination of the necrosed organ through the alimentary canal. If spontaneous recovery in this condition is possible, it would seem plausible that a timely removal of the necrosed organ by surgical interference would add to the chances of recovery. Consequently gangrene is added to the diseases of the pancreas which should be treated by operative measures. The pancreas may constitute one of the component parts of the intussusception in cases of invagination of the bowels. In searching for the cause of intestinal obstruction and peritonitis, during laparotomy, the pancreas should not be forgotten, and when it is found that the primary disease is located in or around this organ, radical measures should be adopted whenever such a course appears practicable. Whenever the sac can be stitched to the external incision, this should be done and the sac opened, disinfected and drained. Search should be made for the necrosed pancreas, and when found detached, it should be removed. As in most of these cases, the retroperitoneal tissue is excessively infiltrated, a counter-opening should be made in the lumbar region and through drainage estab-

lished. If an anterior abdominal fistula cannot be established, the course to be pursued should be the same as in treating a pancreatic abscess under similar conditions.

*Abscess of Pancreas.*—There can be no doubt that in the near future abscesses of the pancreas will be treated on the same principles as suppuration in any other locality. The remote location of the abscess may offer many serious obstacles to diagnosis and a rational course of treatment, but these difficulties will be overcome by improved methods of examination and more perfect methods of operation. As suppuration is only one of the terminations of inflammation, abscess, like inflammation, may occur primarily in the gland itself, or it may commence in the para- or peri-pancreatic tissue. If the abscess is endo-pancreatic, it may be bounded and circumscribed by the proper investment of the gland. If, on the other hand, it commences primarily outside of the gland, it appears as a diffuse abscess, which extends to the pancreas by contiguity; in other words, we speak of the abscess as a suppurative pancreatitis or a suppurative peri- or para-pancreatitis.

As primary, idiopathic, uncomplicated purulent inflammation of the pancreas is an exceedingly rare affection, it is of great practical importance in the surgical treatment of such cases to determine, if possible, the predisposing cause or causes and to remove them or render them inert at the time of operation.

The presence of pus within the pancreas or its immediate vicinity is not indicated by any characteristic or positive symptoms. The symptoms always point to the stomach or liver as the seat of the disease. The most prominent and constant symptoms which have been observed are nausea, vomiting of a clear, greenish or viscid fluid, thirst, loss of appetite, constipation, progressive emaciation and distension of the epigastrium. If the abscess is large, it will be recognized by palpation and deep percussion as a tumor in the epigastric region. In such cases a probable diagnosis may always be made by careful and systematic physical examination and reasoning by exclusion. Finally, in all cases where a tumor can be felt in the epigastric region and a probable diagnosis can be made regarding its benign character, an

exploratory laparotomy should be resorted to for the purpose of making an accurate anatomical diagnosis. The prognosis of abscess of the pancreas is always unfavorable. Death is produced by progressive emaciation and inanition, by septic absorption or secondary lesions in adjacent organs. The treatment indicated is incision, evacuation and antiseptic irrigation and drainage, where needed.

*Hæmorrhage of the Pancreas.*—A number of cases of hæmorrhage of the pancreas are presented and discussed. The author considers that the propriety of surgical treatment of pathological hæmorrhage of the pancreas can only be entertained when the accident takes place in consequence of circumscribed benign pathological conditions which in themselves do not jeopardize the life of the patient, and which admit of measures for arresting hæmorrhage by direct treatment. Operative interference should, therefore, be limited to hæmorrhagic cysts of the pancreas, in well-defined cases of which it would be justifiable to resort to abdominal section as the only means of arresting fatal hæmorrhage, by direct ligature of the bleeding points, or by removing the localized portions of diseased tissue from which the hæmorrhage has taken place. The same treatment is applicable to diffuse hæmorrhage due to a localized lesion.

*Cysts of the Pancreas.*—The remarks on cyst of the pancreas are merely supplementary to the author's previous paper on the subject (vid. ANNALS OF SURGERY, Vol. ii, p. 272). The most important etiological factor in these cases must be sought for in an arrest of absorption of the pancreatic juice due either to a transformation of that fluid by the admixture of pathological products into a substance which is incapable of being absorbed, or to a loss of function in this direction of the vessels which perform this task. Extirpation of the cyst would guard most effectually against the formation of a permanent pancreatic fistula, but on account of the deep location of the pancreas, shortness or absence of a pedicle, and the many obstacles thrown in the way of the operator by adjacent organs, the procedure becomes one surrounded by innumerable difficulties and, in the present state of our science, of doubtful propriety. The formation of an external pancreatic fistula in the treatment of cysts of the pancreas has been so

uniformly successful that it should be invariably adopted in preference to excision, and the latter operation should only be resorted to in cases where portions of the cyst wall have become the seat of malignant disease; likewise in cases where life is threatened by hæmorrhage into a cyst by rupture of the vessels lining its interior and which cannot be controlled by simpler and less hazardous measures.

*Neoplasms.*—Referring briefly to hypertrophy of the pancreas and quoting one doubtful case, he passes on to cancer of the pancreas, noting the uncertainty of the symptoms in the diagnosis of this affection. A satisfactory conclusion can be reached only after a careful consideration of the history of the case combined with a systematic elucidation of all the symptoms presented, and more particularly by resorting to the advantages to be derived from a systematic and careful study by exclusion. A positive diagnosis of malignant disease of the pancreas is only possible after the tumor has attained sufficient size to be recognizable by palpation, and consequently too late for a radical extirpation. When the disease has advanced to this stage, it has already involved the greater portion of the gland and, as a rule, has invaded important adjacent organs. Another important element in the surgical treatment of cancer of the pancreas consists in the fact that the disease, as a rule, develops primarily in the head of the organ, a location which, in itself, precludes the propriety of an operation. The most favorable conditions for extirpation are presented if the disease is primarily located in the tail of the pancreas and has not passed beyond the limits of the capsule of the gland. In such a case, excision of the splenic extremity would offer a fair prospect for a permanent result without endangering, as a remote consequence, the process of digestion, as a sufficient amount of secreting structure would remain in connection with the intestine to maintain pancreatic digestion.

Passing lightly over tuberculosis of the pancreas and lipomatosis of the gland, both of which are extremely rare affections, he dwells rather more at length upon lithiasis of the pancreatic ducts, a frequent affection, the positive diagnosis of which during life is impossible, and the surgical treatment of which is consequently limited to the manage-

ment of some of its consecutive lesions—cysts, abscess and retention of bile, and concludes with the following propositions:

(1). Restoration of the continuity of the pancreatic duct did not take place after complete section of the pancreas. (2). Complete extirpation of the pancreas was invariably followed by death, produced either by the traumatism or gangrene of the duodenum. (3). Partial excision of the pancreas for injury or disease was a feasible and justifiable surgical procedure. (4). Complete obstruction of the pancreatic duct, uncomplicated by pathological conditions of the parenchyma of the organ, never resulted in the formation of a cyst. (5). In simple obstruction of the pancreatic duct the pancreatic juice was removed by absorption. (6). Gradual atrophy of the pancreas from nutritive or degenerative changes of the secreting structure was not incompatible with health. (7). Physiological detachment of any portion of the pancreas was invariably followed by progressive degeneration of the glandular tissue. (8). Extravasation of pancreatic juice into the peritoneal cavity did not produce peritonitis. (8). Crushed or lacerated pancreatic tissue was removed by absorption, provided the site of operation remained aseptic. (10). Complete division of the pancreas by elastic constriction was never followed by restoration of interrupted anatomical continuities. (11). Limited detachment of the mesentery from the duodenum, as required in operations upon the pancreas, was not followed by gangrene of the bowel. (12). In all operations upon the head of the pancreas the physiological attachment of the peripheral portion of the gland should be maintained by preserving the integrity of the main pancreatic duct. (13). Partial excision of the splenic portion of the pancreas was indicated in cases of circumscribed abscess and malignant tumors in all cases where the pathological product could be removed completely without danger of compromising pancreatic digestion, or of inflicting additional injury upon important adjacent organs. (14). Ligation of the pancreas at the point or points of section should precede extirpation as a prophylactic measure against troublesome hæmorrhage and the extravasation of pancreatic juice into the peritoneal cavity. (15). The formation of an external pancreatic fistula by abdominal section was indicated in

the treatment of cysts, abscess, gangrene and hæmorrhage of the pancreas due to local causes. (16). Abdominal section and lumbar drainage were indicated in cases of abscess or gangrene of the pancreas where it was found impossible to establish an anterior abdominal fistula. (17). Through-drainage was indicated in cases of abscess and gangrene of the pancreas, with diffuse burrowing of pus in the retro-peritoneal space. (18). Removal of an impacted pancreatic calculus in the duodenal extremity of the duct of Wirsung by taxis, or incision and extraction, should be practised in all cases where the common bile-duct was compressed or obstructed by the calculus, and death was threatened by cholæmia. (19). In such cases the principal source of danger, extravasation of bile into the peritoneal cavity, should be avoided by preliminary aspiration of the dilated bile-ducts, accurate closure of the visceral wound with fine silk sutures, and absolute physiological rest of the organs of digestion during the time required for the healing of the visceral wound.

JAMES E. PILCHER.



## INDEX OF SURGICAL PROGRESS.

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### GENERAL SURGERY.

**I. Some New Cases of Actinomycosis in Man.** By DR. PARTSCH (Breslau). The author publishes eight new cases of actinomycosis occurring in man, three of which were operated upon by Professor Fischer, of Breslau, and compares certain points in the clinical histories with our present knowledge of the disease as established by the works of Ponfick, Israel and others.

Four cases are given where the disease was localized in the lower jaw or neck, one in which actinomycosis appeared in the cicatrix after operative removal of the breast for carcinoma, and three where the abdominal cavity was invaded by the fungus.

The main features of the cases are as follows :

**I.** Healthy man, had had three roots of decayed teeth extracted, in order to relieve inflammatory swelling on cheek, without effect. Tumor hard, little painful, not movable against the bone. Mouth can be only slightly opened. Warm formentations produce fluctuation after two days, when incision vents reddish-grey granulation-masses containing yellow specks, which prove to be actinomyces germs. Iodoform. Recovery in two weeks.

**II.** Man, æt. 36. One year previously toothache; left molars fell out; presented a small tumor connected with the parotid fascia, scarcely painful, hard to the touch. Taken for lymphatic abscess and incised when typical actinomycosis fungus was found. Wound curetted; primary union.

**III.** Man, æt. 25. April, 1883, difficulty of swallowing, without fever; swelling at angle of lower jaw; poultices; suppuration; burrowing of abscess along sterno-cleido-mastoid muscle; perforation of skin near sternum. Fistula laid open, and actinomycosis found as diagnosed, July, 1883. Antiseptic dressing. Recovery.

IV. Woman, æt. 35. November, 1884, toothache in lower molar, with acute swelling, after which a small tumor remained. June, 1885, suppuration of tumor; burrowing of pus; perforation near hyoid bone; fistula established. Diagnosis made from discharge. Extirpation, antiseptic dressings. Erysipelas of wound. Subsequent recovery. In one of the extracted roots *actinomyces*-growth was found.

V. Man, æt. 60. Operated for carcinomatous tumor of left breast. Large cavity remained after extirpation of axillary glands, and removal of much integument over tumor. Transplantation of skin grafts during granulation. A fistula finally persisted, which was closed by means of iodoform bougies. Two months later small abscesses formed in the cicatrix, which contained *actinomyces*. Curetting of no avail. Deep incision revealed focus at axillary margin of major pectoral muscle, enclosed in cicatricial tissue. Excision and application of actual cautery. Recovery.

VI. Man, æt. 32. Three weeks before admission, pain on micturition. One week subsequently, swelling in right inguinal region, becoming painful. Alvar obstruction.

On admission inflammatory tumor the size of a fist above Poupart's ligament, hard, continuing into the pelvis and to be felt from the rectum; pain on pressure. Incision vented large masses of disintegrated granulation-tissue and pus with feculent odor. Counter-opening above pelvis on dorsum. At first little, subsequently copious discharge making permanent bath necessary. Subsequently discharge continued. Hectic fever set in. Symptoms of chronic lung affection. Death five months after admission. Post-mortem examination revealed a large abscess reaching from the right iliac bone to the liver, into which the intestine had perforated 4 cm. above the cæcum. The pus contained *actinomyces* germs.

VII. Man, æt. 35, had had jaundice during the summer of 1883, was attacked with symptoms of perityphlitis, October, 1884. December: formation of abscess above posterior superior spine of ileum, which, opened in January, 1885, vented  $1\frac{1}{2}$  litres brown offensive pus. February: formation of another abscess near anterior superior spine. venting mostly bloody pulpy matter. May: operation for tumor

which had gradually formed on the os ileum. Incision in the inguinal region disclosed a large cavity on the inside of the ileum approximate to the peritoneum, which communicated with the tumor on the outer side. Fistulæ laid open, part of pelvic wall taken away; glands extirpated; drainage; iodoform-gauze tampons. The pus contained actinomyces fungus. Soon another abscess opened under Poupart's ligament. June: erysipelas of wound. July: hectic fever; the right lower extremity gradually assumed a position as in the first stage of coxitis. Caries of hip-joint could be diagnosed by probing from anterior fistula. Resection of head of femur. Bad condition of wound treated by continuous bath; gradual decline of patient's strength through diarrhœa and hectic fever. August 15: sudden accession of universal acute peritonitis. Death. •

Post-mortem examination revealed the cæcum adherent to the iliac bone; a large abscess reaching to the tuber ischii, connecting with the hip-joint, with the resection-wound and with a fistula reaching to the sartorius muscle.

VIII. Man, æt. 56, had abdominal colics with vomiting, in the spring of 1882, in three successive attacks. Autumn, 1883, a tumor developed under similar symptoms, gradually increasing in size and situated midway between the umbilicus and the right anterior superior spine. Aspiration having disclosed pus, incision was made, the abscess containing granulation-tissue and pus, curetted; iodoform dressings applied. Wound healed in three weeks. Patient dismissed. Pain said to be again recurring on last accounts. December, 1885.

The first cases tend to corroborate the statements that actinomycosis of the lower jaw is a curable affection, while the interesting disclosures by the microscope of the presence of actinomyces germs in carious teeth throw some further light on the manner in which the fungus invades the body. In this connection a case of Murphy, of Chicago, is also cited. In other cases, however, the author admits that our knowledge of the exact mode of entrance of the germ into the body is altogether hypothetical. The fifth case seems to make it probable that the germ may enter through ulcerations of the skin, and also proves that the disease is curable as long as the foci can be reached with our surgical instruments.

The latter cases are classed by the author among abdominal and not with intestinal actinomycoses. He calls attention to the fact that the germs alone do not cause septic symptoms, unless other bacteria, as those from the alimentary canal, accompanying them. He points out the protracted course of the disease as shown in the last two cases, and the pathognomonic anatomical symptoms; the small amount of pus, the tortuous forked fistulæ, the callous thickened walls lining the seat of the affection, and the presence of the small yellow kernels in the pus and in the fungus granulations.

Amyloid degeneration of the internal organs frequently accompanies the disease, as in the two cases before the last.

Operative interference is of little avail in most cases of abdominal mycosis, and cannot well be extended beyond incision and scraping-out of the foci. It is of great importance, however, to keep out septic infections by means of antiseptic dressings, and if these are not sufficient, permanent baths or irrigations are of good service.

In conclusion the author, from a clinical point of view, refutes the opinion advanced by Poleck, that the actinomyces-germs are identical with merulius-fungus.—*Deutsch. Zeitschr. f. Chir.* Bd. 23. Hft. 5 and 6, June, 1886.

W. W. VAN ARSDALE (New York).

**II. Troubles Consecutive to Thyroidectomy.** By JACQUES L. REVERDIN (Geneva). As a result of the observation of eleven cases of his own with a study of the literature of the subject, the writer concludes: 1. The troubles consecutive to thyroidectomy in the human species constitute the same ensemble of symptoms as myxœdema or *cachexie pachydermique*. 2. Total extirpation of the thyroid body is not invariably followed by myxœdema in the adult. 3. Surgical myxœdema is, unlike medical myxœdema, susceptible of amelioration, perhaps even of cure. 4. In cases of amelioration, small tumors, probably developed in aberrant lobules of the gland, are observed sometimes long after the extirpation; but amelioration may manifest itself without these conditions.—*French Congress of Surgery, Revue de Chirurgie*, November, 1886.

III. Case of Sudden Death from the Introduction of an Aspirator Needle into a Hepatic Abscess. By J. C. REEVE, M. D. (Dayton, Ohio). The patient was enfeebled by an illness of six weeks duration and, a diagnosis of hepatic abscess having been made, an aspirator needle was thrust into the liver; the patient immediately went into collapse and, within a minute and a half from the puncture of the needle, life was extinct. Autopsy revealed no lesion other than the abscess of the liver, and the author thinks death was evidently due to inhibition of the heart's action, the impulse being transmitted from the puncture, and is convinced that (1) under full anæsthesia this man would not have died at the time and in the manner he did; (2) under partial anæsthesia, death would have occurred as it did, and would have contributed to swell the list of casualties from anæsthetics; the mode of death is entirely similar to those which have occurred from the extraction of teeth under chloroform, when the movements of the patient, etc. showed that anæsthesia was not profound.—*Med. News*, January 1, 1887.

#### OPERATIVE SURGERY.

I. Improved Procedure for Inter-Scapulo-Thoracic Amputation of the Upper Extremity. By PAUL BERGER (Paris). The complete ablation of the upper extremity with the scapula has recently been performed a considerable number of times; the author has collected forty-eight cases with 80 % of success. The procedure which he proposes is the result not only of cadaveric studies, but also of an analysis of all known cases; it is a synthesis of the best methods that have been proposed. It is an amputation by two flaps, one antero-inferior or pectoro-axillary and the other postero-superior or cervico-scapular, in two successive stages which are executed, the former in two steps, the latter in three.

The object of the first stage is preliminary hæmostasis; it begins with section of the clavicle followed by resection of the middle part of that bone (first step) and ends with isolation and division between two ligatures of the subclavian vessels (second step).

The second stage begins with the formation and deep dissection of

the antero-inferior or pectoro-axillary flap, of which the extremities of the pectoralis major and minor and the latissimus dorsi muscles form a part, a dissection which permits the section of the brachial plexus and extends to the subscapular insertions of the serratus magnus (first step); then follows the incision and elevation of the supero-posterior flap, lined by the trapezius alone which is continued to the superior and internal limits of the scapula (second step); then follows the section of the insertions of the serratus magnus, the omo-hyoideus, the levator anguli scapulæ and the rhomboideus muscles at the superior and internal borders of the scapula (third step).

The incision designed for the exposure, isolation, section and resection of the clavicle, and for the application of the ligatures should be about 10 cm. long; it should end without immediately behind the acromio-clavicular articulation, on the depressible apex of the angle formed by the posterior border of the clavicle and the crest of the scapula; it should begin within at two finger's breadths from the sterno-clavicular articulation of the clavicle, on the clavicle, in front of rather than above it; the incision is straight between these two points.

To trace the posterior flap, it will be sufficient to prolong the incision behind the scapula, by the shortest way toward the posterior face of the scapular angle where it will meet the antero-inferior flap. The outline of the latter begins at the level of the scapular incision, is directed forward and downward to the tip of the coracoid process, curves at the union of the pectoralis major with the arm, traverses the internal face of the root of the extremity, thence to the tendon of the latissimus dorsi, curves, and descends behind, following the visible and tangible groove, separating the axillary border of the scapula from the muscular mass of the latissimus dorsi and teres major, to stop behind the inferior scapular angle.

The first incision for section of the clavicle should not go down to the bone at once, for there may be a communicating vein between the cephalic and the internal jugular, which might be divided. The resection of the middle of the clavicle should be subperiosteal, after which the exposed portion of the subclavius should be removed; after this nothing is left, the fascia being so thin as to be neither felt nor



seen. The index finger, passing toward the neck in front of the nerves, easily strikes the sharp edge of the omo-clavicular aponeurosis, where are the subclavian vessels, to which a double ligature *en masse*, not including the omo-hyoid muscle, should be applied, and the vessels divided. The artery should then be sought for and ligatured by itself, then the veins, and the vessels should be cut between the ligatures, just below the clavicle.

This done, the anterior flap should be marked out and dissected up; the same should be done for the posterior. Then the operator should seize the root of the limb firmly and draw upon it as if to tear it away; this disengages the superior and spinal borders which are quickly released by a rapid section of the double layer of muscles attached there. The operator then looks in the neck, without the brachial plexus and near the section of the levator anguli scapulæ, for the point where the posterior scapular artery was divided, seizes and ligatures it.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

#### NERVOUS AND VASCULAR SYSTEM.

I. Distance-Suture of Tendons and Nerves and Some Applications of Animal Grafts. By GEORGE ASSAKY (Lille). This suture consists in connecting by long suture threads the two ends of parts, the apposition of which is unobtainable. The first suture of this kind was made by Benjamin Anger for the tendon of the extensor minimi digiti; the two ends were 9 cm. apart, but traction reduced the distance to 2 cm., and he connected them by a silver suture with a satisfactory result. Gluck substituted catgut in two cases with satisfaction. With M. Fargin, the author has applied distance sutures; the tendons regenerated along the threads are always stronger than those spontaneously regenerated; the number of tendinous fasciculi is greater. This operation is clearly indicated whenever apposition is impossible; it is more particularly applicable to tendons without a sheath.

They also made experiments upon the application of distance sutures to nerves. They interposed between the two ends of the divided nerves fragments of tendon, muscle and spinal cord. The

mechanical conditions had great influence in the regeneration of nerve tissues ; catgut gave the best result ; silk threads remained indefinitely in place without taking part in the nerve regeneration. In every case examined microscopically, the cicatrix contained connective tissue, but also a great quantity of nerve fibres. This operation then seems to be indicated when the apposition of the two ends of the divided nerve is impossible, and also after certain surgical operations, the ablation of a neuroma for example.

It was shown by their experiments that tendon may be grafted to animals of the same species and of different classes. These facts have already been applied to man twice. M. Peyrot has obtained in one case the transplantation of a dog's tendon and in another a cat's tendon. All attempts at nerve grafting completely failed ; in certain cases there was no elimination, but it could be ascertained that the transplanted nerve-tissue did not enter into the regeneration.—*French Congress of Surgery, Revue de Chirurgie*, November, 1886.

**II. Nerve Suture.** By P. TILLAUX (Paris). Nerves may be sutured immediately after an accident or later, primarily or secondarily. It is said that the peripheral end of a divided nerve surely degenerates and that primary union is impossible ; this is not true. A young man falling on some glass sustained a vast wound of the posterior face of the forearm ; the median and ulnar nerves were divided and sensibility was entirely lost. They were sutured immediately and on the following day sensation had returned to the end of the fingers. The evidence of this case seems to be incontrovertible for the re-establishment of sensibility cannot be attributed to the anastomosis of the median and the ulnar for they were both divided ; neither can it be attributed to the radial, for in that case sensation would have existed before the suture. It must be accepted then that the "nervous circulation" was re-established immediately after suture and that primary union of divided nerves can occur. In any event, if the suture does not secure primary union and immediate restoration of function, the two ends of the nerve are put in conditions the most favorable for union by granulation

Secondary suture should be performed in every case where primary suture has not been performed, whatever be the period from which the section dates. In one case where he had undertaken secondary suture, he found that the central end had granulated; it had sent out a grayish filament to meet the peripheral end, but it had fixed itself upon the tendon of the palmaris longus. In this case, the paralysis could not have been cured spontaneously. The two ends were sutured; the patient left the hospital without having gained anything, but at the time of the communication, he had regained sensibility. He makes the suture with a very fine needle, using a single thread; he punctures one of the ends of the nerve on its nearest face making the needle emerge at a diametrically opposite point, repeats the manoeuvre in the opposite direction on the other end and ties the knot, taking care to bring the two surfaces into apposition, but not too closely, for in that case the neurilemma may be folded and introduced between the two surfaces, hindering the union of the nerve tissue. He concludes :

1. Nerve suture should always be performed primarily as well as secondarily.
2. It may reestablish almost immediately "nerve circulation".
3. In any case, it favors union by granulation. *French Congress of Surgery. Revue de chirurgie*, Nov. 1886.

JAMES E. PILCHER (U. S. Army).

### III. Case of Ligature of the Common Carotid. By AUGUSTE REVERDIN (Geneva).

A man had been shot with a revolver in his right ear. By means of Trouvé's apparatus the bullet was found to be lodged in the bone. Efforts to dislodge it only resulted in such severe hæmorrhage from the petrous portion of the internal carotid artery that he at once had to cut down upon the common carotid and tie it. The injured vessel was afterwards divided between two ligatures. No syncope occurred during the operation, nor was it followed by any aphasia or hemiplegia. After several days the injury to the arteries was considered absolutely repaired, but a few weeks were allowed to elapse before

the patient was put under ether and the bullet removed without difficulty; the patient got quite well. It was considered necessary to remove the projectile, owing to the presence of a compound fracture of the cranium. An interesting point about the case is that after ligation of the common carotid the distal portion of the internal carotid did not bleed, and no cerebral symptoms were observed. This was probably due to a clot having been formed in its course which resisted owing to the antiseptic precautions taken.—*Proc. French Congress of Surgery*, 1886. *Le Progrès Médical*, Oct. 30, 1886.

**IV. Ligation of Right Internal Iliac Artery.** Before the Academy of Medicine, M. PONCET, of Lyons, reported having ligatured the right internal iliac artery for a pulsatile tumor of the right buttock. It is the first time the operation has ever been performed in France. The patient was a youth of 20, with a tumor the size of the fist. There were all the characters of an arterial aneurism and spontaneous bursting seemed imminent. M. Poncet employed the Marcellin Duval incision, and ligatured with carbolized silk. The tumor ceased pulsating at once and its volume diminished daily. After 22 days' treatment the patient left the hospital with a sinus at the lower angle of the wound. Two months afterwards he died from severe hæmorrhage after abundant suppuration. Post-mortem, the pelvis was found to contain a phlegmon in a state of suppuration from the lower end of which the hæmorrhage had occurred. The tumor was a subcutaneous arterial angioma,—*Le Progrès Médical*, Oct. 30, 1886.

L. S. MARK (London).

## HEAD AND NECK.

**I. Two Cases of Gun-Shot Wound of the Palate.** By Dr. A. KOEHLER (Berlin). Gives two cases observed in Prof. Bardleben's clinic in Berlin, one of which died after one month, the other dismissed after eight months as recovered. He precedes the cases with some general remarks concerning gun-shot wounds of the skull especially those in which the projectile enters through the palate (to which the title of the paper applies), describes three specimens of such

injuries preserved at the Frederick-William Institution at Berlin, records three experiments made with a pistol upon the cadaver, gives a summary of eleven cases of injury to the carotid or of other causes producing traumatic pulsating exophthalmus, as a complement to Sattler's statistical table of 106 similar cases, and finally adds a list of the literature of the subject.

The injuries resulting from the discharge of a gun or pistol into the mouth vary considerably according to the size, calibre and charge of the weapon used : a charge of water is very destructive ; weak charges, blank cartridges, etc., seldom cause instantaneous death, but lead to secondary chronic disturbances, such as do gun-shot wounds of the face ; or they may cause death through hæmorrhage or suffocation. Phlegmons are another source of danger. Hæmorrhage may occur from all the vessels coursing from the neck to the head, the internal carotid and the vertebralis included ; anomalies in the function of the nerves situated near the base of the brain may be caused, with or without fractures of the base of the skull ; but injuries to the canal for the carotid causing pulsating exophthalmus from lesions to the nerves here situated, are rare from bullet-wounds because death is instantaneous in these cases.

The new cases are as follows :

I. Pistol-shot wound of palate ; paralysis of the 3d, 4th, 6th, 7th and 8th pairs of nerves, with pulsating exophthalmus ; relative recovery ; time of observation eight months.

Man, æt. 20, found in unconscious condition. Vomiting. Regained consciousness towards evening. Respiration 24 ; pulse 76. No paralysis nor contractures. Coagula of blood in nose. In hard palate perforating wound, corresponding to ball of 7 mm. calibre. For subsequent four days somnolence, posture on right side, deafness of left ear, headache, especially on left side.

After four days pulse sank to 56 ; paresis of left facial nerve, increasing to paralysis by the eleventh day (ptosis, etc.), when pulse was again normal, but left pupil failed to react, was dilated and left bulb protruded ; paralysis of all the muscles of the left eye present.

After four further days slight rotatory movements of the eye around

its own axis (trochlearis n.) were observed. Chemosis. One month after injury pulsation of the bulb was first noticed, continued for three months. Pressure applied to left carotid checked the pulsation and the humming sensation perceived by the patient. Ophthalmoscopically enlarged veins, contracted arteries, no strangulation of papilla. S.  $^{15}/_{100}$  (opacity of cornea). Tension not increased. No disturbance of sensibility.

Diagnosis : rupture of the internal carotid in the sinus cavernosus or in the canalis caroticus.

The author believes the aneurism to have developed slowly in a few weeks after concussion, not fracture, of the petrous pyramid.

At dismissal, eight months after injury, improvement of many symptoms could be recorded. The sixth and eighth pairs of nerves remained totally paralysed. Paralysis of facialis nerve gradually improved, from the thirty-seventh day after injury, and had entirely disappeared on dismissal. The trochlearis nerve had already recovered after a few days.

The other muscles of the eye began to functionate about four weeks after injury. At dismissal the patient still complained of subjective sensations, both pulsating and continuous. Treatment consisted in rest and ice; afterwards compression of the carotid, both digital and by means of compressoria. Compression-bandages on the eye. Ligation of the carotid was considered, but not thought indicated, as the patient improved. The ball was not found nor sought for.

II. Man, æt. 29, shot himself in the mouth with a small pistol, Great hæmorrhage, unconsciousness. Regained consciousness in hospital, complained of pain on left side of face and neck. No hæmorrhage in ear, no paralysis, no vomiting, no visual disturbance; sense of hearing impaired on left side. Wound of the left soft palate. P., R.. Temp. normal. During following days inflammation about wound—rigors with temperatures of 39.0° and 40.0° C. After three days general condition improved, suppuration of wound diminished, but irregular rigors continued; diarrhœa, heart-murmurs, pain in shoulder-joint, pleuritic effusion set in; and death occurred one month after the injury.

Diagnosis : sepsis. Treatment, irrigation with salicylic acid; chinin.



Post-mortem examination revealed the ball lodged in the posterior wall of the foramen jugulare, without having wounded the carotid or the facialis nerve. Thrombosis of sinus transversus and sinus petrosus, in purulent disintegration. Purulent exudations in pleuræ.—*Deutsch. Zeitsch. f. Chir.* Vol. 23. Hft. 56. June 10, 1886.

## II. New Contributions to the Study of Hemiglossitis.

By Dr. PAUL GUETERBOCK (Berlin). The author publishes a new case and makes some further general remarks, in addition to his paper published last year (vide ANNALS OF SURGERY, Vol. III, page 76), chiefly concerning latter stages of the disease known as hemiglossitis. This is an acute inflammatory affection attacking only one lateral half of the tongue, lasting only a few days, and generally disappearing again rapidly and without leaving any secondary morbid changes.

It appears, however, that such changes do occasionally occur, as instanced in the case given.

Acute suppuration and gangrene as secondary effects of hemiglossitis the author believes impossible, and thinks where these symptoms were observed they were due to simple phlegmons of the tongue.

After inflammation of the whole tongue induration in one of the halves has been observed, but not after true hemiglossitis, excepting in one case reported by Graves.

The author's new case is as follows:

Man, æt. 17, said to have been similarly affected one year previously. Was healthy; no history of syphilis. Presented a diffuse swelling of the tongue the size of a plum-kernel situated in the anterior portion of the left half of the tongue, very sensitive to pressure. No fluctuation. Exploratory incisions revealed no pus. Gums not affected; no offensive odor; no herpes; no ulceration. Dismissal after nine days with induration the size of a cherry-pit, which persisted after seven months.

The author does not attempt to explain the persistence of the induration by nervous influences, to which hemiglossitis itself has been attributed.

In regard to treatment he believes incisions useless, and the ordering of a mouth-wash sufficient — *Deutsch. Zeitschr. f. Chir.* Vol 23. Hft. 5 and 6. June, 1886.

W. W. VAN ARSDALE (New York).

**III. Note on Blood Tumours of the Cranium Communicating with the Superior Longitudinal Sinus.** By M. LAN-NELONGUE (Paris). The author observed in an infant a tumor of the cranium, soft and irreducible, and diagnosed an angioma. But at the autopsy, it was discovered that this tumor presented a pedicle which passed through the membrane connecting the parietal bones and communicated through two large veins with the superior longitudinal sinus. He has been able to collect 21 analogous cases; in 12, the tumor was congenital; in 7, it was consecutive to a traumatism, and in 2, the origin was undetermined.

The tumors of congenital and traumatic origin do not have the same pathogeny. Two of the traumatic cases were due to perforation of the sinus by splinters of bone; the wound remained open connecting the sinus with the tumor. In two others, the tumor communicated with the sinus, not directly but through the veins of the dura mater; there the sinus did not appear to be broken; the afferent veins were ruptured.

Among the 12 congenital cases, 5 have been examined anatomically; they present two essential points; they are not hæmatomata but veritable angiomata and this angioma communicates with the intra-cranial veins. The longitudinal sinus may itself have undergone a dilatation. They are then epicranial angiomata accompanied, as a rule, by a dilatation of the afferent veins, but these veins are properly the emissary veins connecting the intra- and extra-cranial circulations, which explains the communications of these tumors. The circulatory troubles arrest or retard ossification, contrary to the ancient opinion which attributes the origin of these tumors to rachitis; the osseous alterations, far from being primary, are always consecutive. On the vault of the cranium there are observed two varieties of blood tumours communicating with the superior longitudinal sinus.

1. Those whose origin is traumatic and consecutive to opening of the sinus or, at least, the emissary veins in proximity to it; the failure of obliteration of these vessels permits the epicranial hæmatoma to continue in communication with the sinus. These tumors in which there exists a true circulation, resemble aneurisms, and may be called traumatic venous aneurisms.

2. The second variety are angiomas proper; it is a congenital affection and more frequent than the preceding. It is an affection of the peripheral circulatory apparatus appearing in the territory of the emissary veins, which explains its connection with the sinus.

The therapeutic indications in the two classes differ. In traumatic angioma, all operative intervention should be rejected; direct compression, which has never been recommended or employed seems to him a desirable method of treatment; it should be applied with care and precaution not to press osseous fragments into the cranium. The effect will be all the more positive the nearer to the time of the accident it is applied

Congenital communicating angioma presents other indications. Puncture has never determined a cure; they have several times been incised and produced hæmorrhage which was usually easily controlled and did not recur, but a cure was not obtained. In a remarkable case of Pelletan, there were repeated hæmorrhages and the patient finally died of suppurating meningitis with probable phlebitis of the sinus. Irritant and coagulating injections are out of the question here, for they would greatly endanger phlebitis of the sinus. Abstinence should be the rule in small, stationary or very slightly progressive angiomas of little volume, producing no inconvenience nor accident. But if the growth of the angioma is continuous and rapid, if rupture by thinning and inflammation of its coverings is impending, extirpation should be resorted to. The first step should consist either of ligature of the pedicle *en bloc* or isolated ligature of the emissary veins, according to the case.—*French Congress of Surgery, Revue de Chirurgie*. Nov., 1886.

IV. Branchial Cysts and Fistulæ. By M. CUSSET (Lyon). Four cases are reported. 1. A case of branchial cyst interesting in

being located above the ear; no operation was performed. 2. A cyst occupying the parotid region; it was incised by M. Poncet and found to be adherent to the inferior maxilla; the sac was not dissected out for fear of wounding the facial nerve, but was destroyed by cauterization with chloride of zinc. 3. A case of branchial fistula of the neck the orifice lying in the median line, 3 cm. above the sternum. Above, the skin had a cicatricial appearance, although there had never been any wound there; the maxilla was markedly undeveloped, the prominence of the chin hardly existing. Exploration of the fistula was very painful, the probe passing downward toward the mediastinum. M. Poncet attempted the dissection of the fistula, but soon finding it to continue into the mediastinum, he contented himself by dividing it below the sternum; cure supervened. 4. In another case, at the age of 10, a little tumour was observed on the right side of the neck, taken for an abscess and incised; a fistula persisted, which was obliterated by injection of tincture of iodine, but a new collection formed, which was also incised; it could then be seen that the cavity was lined by a fine mucous membrane; it was extirpated and histological examination showed two or three layers of epithelium of a Malpighian type resting upon a dermis, in which were found glands analogous to those of the pharynx and epiglottis, such as have been noted by Monod, Duval, Trelat, and many others; it showed the necessity of extirpating the entire sac with the scalpel under penalty of a recurrence.—*French Congress of Surgery, Revue de Chirurgie*. Nov., 1886.

**Extirpation of the Larynx.** By M. LABBÉ (Paris). The writer has performed this operation three times. The first case was for an enormous sarcoma originating in the larynx and requiring tracheotomy; but, the tumor once overlapping the larynx, developed rapidly in the pharynx and soon became an absolute obstacle to deglutition. The larynx was extirpated with the tumour, and the patient made a good recovery. The second was a case of epithelioma; the operation was very easy, but the patient died. During the night after the operation, the assistant changed the canula but once, and this negligence was probably the cause of the septic pneumonia which determined death.

The third was a very large epithelioma, requiring the removal of not only the larynx, but also the trachea down to the sternum, and that without reaching the limit of the disease. The patient recovered, but died  $4\frac{1}{2}$  months later from a recurrence. The operation is easy of performance, and from that standpoint is not excessively grave. And from the standpoint of survival, it is like other operations for tumours, indicated in relatively benign and in a number of epithelial tumours. The operation is composed of several steps: (1). Preliminary tracheotomy, which should be done so as to permit a point of healthy skin to be left between the two wounds after the operation. (2). Anæsthesia, which is very easily obtained by placing a sponge filled with chloroform in front of the canula. (3). The preservation of the trachea. The canula of Trendelenberg is excellent provided, the reservoir be filled with water and not with air. It is important to habituate the patient to the canula before the operation. (4). The operation itself. He makes an incision, the transverse branch of which lies at the level of the hyoid bone and the vertical stops within a centimetre of the tracheotomy wound. He then cauterizes with the fine knife of the galvano-cautery. When the muscular insertions are detached, the larynx should be isolated with the spatula and fingers like a tumour. To separate the larynx from the œsophagus, the procedure from above downward is preferable. When the upper part is reached, incline the larynx to one side and cut the greater cornu of the hyoid bone of the opposite side. Then dividing the other cornu, the larynx is released. Then the epiglottis is examined and removed or left in place according to its state. Apply several sutures above, insert the œsophageal catheter and dress with iodoform gauze.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

JAMES E. PILCHER (U. S. Army).

## CHEST AND ABDOMEN.

I. Further Observations on Thoracocentesis for Empyema. By Dr. PAUL BLUMBERG (Baku). The author published two cases of empyema treated with paracentesis by means of a trocar, the canula of which was allowed to remain in the wound until recovery

was complete, which appeared in the *Zeitschrift f. Chirurgie*, Vol. 22 (vide ANNALS OF SURGERY, Vol. iii, p. 83). Since then his views have met with opposition, especially in the Caucasian Medical Society.

In the present paper he meets the objections raised. No new cases are given.

The author concedes that free incision, as a mode of treatment for empyema is preferable to paracentesis; but he argues that the latter may be preferable under certain conditions, as in country practice without assistance, or when empyema of the left side prevents the use of an anæsthetic, or when the patient refuses his consent to the operation of incision and resection of ribs.

Paracentesis, moreover, does not prevent the subsequent performance of the operation of incision, which may in some cases be delayed with advantage.

Antiseptic precautions can be quite as readily carried out, if a canula is inserted into the pleura, as when an incision has been made. A double-current catheter may be employed for the daily irrigations of the pleura, without fear of compression of the lung or dislocation of the heart.

Nor is it to be feared that fibrin shreds may occlude the canula. The author has never seen loose masses of fibrin in moist pleuritic exudates, and does not believe they occur. Occlusion through pus may be combatted by irrigation.

The use of the author's canula also does away with the necessity of a diagnostic aspiration. If, after introduction of the canula, the pleuritic effusion proves to be serous, the canula is to be afterward removed; if it proves purulent, the canula is left in situ.

Two cases illustrating his manner of operating are promised shortly. *Deutsch. Zeitschr. f. Chir.*, Vol. 23, Hft. 5 and 6, June, 1886.

**II. Laparotomy and Intestinal Suture for Perforating Typhoid Ulceration.** By Prof. A. LUCKE (Strasburg). A fatal case with remarks. A woman, æt. 28, had just been dismissed from the obstetric department after her sixth puerperium, when she was seized with typhoid fever and admitted to the medical department.



Fever continued over  $40.0^{\circ}\text{C}$ .—treated with antipyrin, for one week, when suddenly severe abdominal pains with rigors occurred, cold sweats, collapsed condition, pulse 180, small, localized pain on pressure at umbilicus, vomiting, tenesmus; treatment, opium, and ice locally applied. Diagnosis was made of perforation of typhoid ulceration, and laparotomy proposed. Under suitable precautions, dimethyl-acetale-chloroform being administered as an anæsthetic, incision was made in the middle-line; a quantity of greyish turbid fluid escaped, having a faint feculent odor, and containing numerous fibrin flakes. Presenting intestines slightly adherent and covered with fibrin-formation. In the small intestine a perforation was soon recognized; the part removed by a cuneiform exsection; sutures to mucous membrane, and Lembert's sutures applied—the gut again disinfected, and replaced—the abdominal cavity having previously been irrigated with salicylic solution, and thoroughly cleansed.

Suture of peritoneum, of integument; large drainage-tube inserted in lower angle of wound. Iodoformized dressings, and wood-wool.

Duration of operation nearly two hours; towards the end failing of pulse at wrist, which did not again recover, in spite of stimulants. Death next morning—nineteen hours after operation, with temperature of  $40.7^{\circ}\text{C}$ . Post-mortem revealed presence of feculent pus in Douglas' pouch, the end of drainage tube leading into it abruptly bent and occluded. Sutured portion of gut in good condition.

The case is published on account of the interest recently excited in the indication given for laparotomy by perforation of typhoid ulcers. The prognosis is bad, in any case.

The puerperal condition of the patient enhanced the danger in this case. The long duration of the operation is a disadvantage, especially as peritonitis is already present.

The author proposes to perform the operation at two sittings; making an artificial anus the first day, and suturing the gut, or resecting it, the second. Several ulcerations might be included in one excised piece. A drainage tube into Douglas' cul-de-sac he thinks indispensable, especially if the operation were to be done at two times.—*Deutsch. Zeitschr. f. Chir.* Bd. 25. Hft. 1 and 2., Dec., 1886.

W. W. VAN ARSDALE (New York).

**III. Operations for Echinococci of Liver.** By Prof. N. V. SKLIFOSOVSKY (Moscow, Russia). In the surgical clinic of the Moscow University, Prof. Sklifosovsky has operated on three patients for echinococci of liver.

**CASE I.** Anna F., a peasant woman, was admitted to the clinic on April 8, 1886. It was found that three large cysts were connected with the liver; the largest of them, the size of the head of a ten-year-old child, was in the middle of the belly, almost reaching the pubes; the second one, of a smaller size, was projecting from behind the edge of the ribs, and the third one, of the size of two fists of an adult person, was projecting in the axillary line. The latter two cysts were fluctuating, their contents easily passing from one to another. The former cyst was rather hard, and had no connection with the other two. An opening 10 cm. long was made in the linea alba, between the navel and the pubes. Thin layer of left lobe of liver was found to extend down within  $1\frac{1}{2}$  inches from the pubes. The professor turned it aside and then sewed the sac of the cyst to the abdominal wall. As fluid began to flow from the cyst (punctured by the needle) a large trocar was introduced and the contents of the cyst were half emptied; then the cyst was firmly attached to the wall and perfectly emptied. Iodoform dressing. There was no fever after the operation. In eight days another operation was performed. An incision, 12 cm. long, was made in the mammary line and the liver, was sewed to the edges of the wound. Four days after a trocar was introduced into the cyst (the liver tissue over it being about 2 cm. thick) and the contents of both cysts was emptied. The sacs were washed with a solution of corrosive sublimate, drainage tube was introduced (likewise in the first operation) and the wound dressed. The patient was doing well, but as the clinic was closed, she was transferred to a city hospital. The final result is unknown.

**CASE II.** V. M., male, æt. 44, always kept many dogs. Since January, 1884, he complained of a pressure in the side of the liver, and in May a tumor, the size of a fist, was perceptible. The patient was admitted into the clinic on May 11, 1885. He was very emaciated; never had had jaundice. A tumor of the size of the head of a new born

babe was connected with the left lobe of the liver. The patient felt no pain in the liver, but he complained of a shooting pain in the left shoulder and of a dull pain in the lumbar region. Operation on May 25. An incision 8 cm. long was made and the cyst was attached to the abdominal walls by silk sutures. Five days afterwards a trocar was introduced and a plate full of fluid with some hydatid sacs was emptied. The same contents continued to flow through a drainage tube. On May 26, during a paroxysm of cough, the patient felt as if something had burst about the cyst, and immediately a stream appeared from the drainage tube, giving five platefuls of an opaque fluid, pus and hydatid sacs. Since then the patient was rapidly improving. July 15 the sac was filled with healthy granulations, and the drainage tube only 5 cm. long could be introduced.

CASE III. P., lawyer, was treated for pleurisy in July, 1884, without any improvement. On February 6, 1885, in the clinic, the patient had a paroxysm of cough and he spit out a large hydatid sac. On February 10, again a spasmodic cough, and the patient spit out about two hundred sacs of different sizes. It was evident that the echinococci of the liver found their way to the lungs without affecting the diaphragm. Professor Sklifosovsky performed the following operation: He made excision of a part of the sixth rib, 10 cm. long, between the mammary and the axillary lines, and then made a large opening into the cyst from which a purulent fluid had burst, containing a large amount of hydatid sacs and some bile. Corrosive sublimate wash and drainage. In three weeks there was no more connection between the cyst and the bronchial tubes. On May 30 the patient left the clinic cured.

Dr. J. K. Spijarny, who reported these cases, on having reviewed the former methods of treatment for the echinococci of the liver, comes to the conclusion that the opening of the cyst in two sittings (Volkmann's method) or in one sitting (the latest method) must be preferred to all other methods (puncture, cauterization, injection, etc.)—*Vratch* (St. Petersburg), Jan. 16, 1886.

P. J. POPOFF (Brooklyn).

IV. On Subdiaphragmatic Echinococci and their Treatment. By Dr. LEOPOLD LANDAU (Berlin). Davaine, in 1860, and

Frerichs, in 1861, demonstrated that echinococcus sacs in the liver grow with greater frequency into the right side of the thorax, pushing up the diaphragm, compressing the lung, and displacing the heart upwards and to the left.

These authors have described cases, coming under their own observation, where the diaphragm was pushed upwards as high as the second rib and the heart raised up to the third intercostal space.

Seligsohn, Herrlich and Genzmer have reported similar cases. Israel operated a case of echinococcus of the convexity of the liver, making a resection of the ribs, a plan of treatment which Roser had recommended in 1864.

The author reports the following cases :

CASE I. Female, *æt.* 36. Eleven confinements. For the past six years she has remarked a swelling in the epigastrium and another in the right hypochondriac region. Two years ago pains in the chest between the shoulders began; also disturbances of digestion, frequent vomiting, heart palpitations and increasing difficulty in breathing. These symptoms increased in time very considerably, the dyspnœa being frequently very great and alarming. On examination, pulse was 108, temperature slightly above normal, and percussion and auscultation pointed to hydrothorax of both sides. Dulness on left side extended much higher up than on the right, beginning at the third rib in front, on the right side at the middle of the scapula.

In spite of this dulness sharp vesicular breathing distinctly heard below the niveau of the dulness in the axillary line. Heart displaced to the left and upwards. Just below the ensiform process a swelling is visible when the patient assumes a recumbent position. This swelling is solid to the touch, and its dulness undistinguishable from that of heart or liver. Abdomen distended irregularly, the right hypochondrium being much more so than the left, and occupied by a large tumor, the upper boundary of which is the fourth rib, its lowest near the crest of the ilium. No fluctuation of the epigastric swelling and no hydatid fremitus. Clear fluid is drawn off on introducing a needle. Operation. Incision, exposing liver, made in the linea alba, beginning about three fingers' width over the umbilicus, and ending at the

xiphoid process. Nothing of the echinococcus sac at first detected, but on passing the finger behind the xiphoid process up along the diaphragm, a hard spot was felt on the convexity of the liver. This organ was anteverted and dislocated downwards. Two sutures introduced at each angle of the wound through the parenchyma of the liver, peritoneum and abdominal walls, and held, tightly drawn, by an assistant. The sac lay more in the left hypochondrium than in the right, on the convexity of the left lobe. The liver was incised to the depth of 3 ctm., when hundreds of echinococci vesicles and about  $\frac{1}{2}$  a litre of clear fluid was evacuated. The number of vesicles was about 500, varying from the size of a bean to that of a hen's egg. The large sac was attached above to the diaphragm. The edges of the liver wound were united to those of the abdominal incision by strong vertically placed sutures, the cavity of the cyst cleansed with a solution of corrosive sublimate (1 to 5,000), and three rubber drainage tubes (15 ctm.) inserted. Operation lasted 50 minutes. The drains remained for 38 days, when fresh ones were introduced. Cavity completely closed eleven weeks after the operation. During this time no irrigation of the cavity. Patient made a good recovery, giving birth to a child 10 months after her discharge.

CASE II. Female, æt. 37, healthy and strong until five years since. From that time on gastric disturbances, dyspnœa increasing in intensity. Motion is painful, and in walking her whole body inclines to the left. When she attempts standing in an erect position, great pain is felt. Respiration rapid, superficial. Over right lung dulness on percussion, beginning in front at the fourth rib. and posteriorly about the middle of the scapula. No respiratory murmur heard there. Heart displaced to the left. Abdomen distended in the right upper portion by a tumor extending from the region of the axilla to the umbilicus. The same is soft, elastic and smooth on palpation. On puncturing in the eighth and ninth intercostal spaces, in the axillary line, some watery, clear, neutral fluid is drawn off. Operation: Beginning at the axillary line, the incision was made parallel to the fibres of the external oblique muscle, about 16 ctm., in a downward direction, ending circa-3 ctm. above the margin of the liver. Division of the transversus,

fascia, etc., and the liver pushed to the left and retroverted.

The latter was then sutured to the abdominal wound. The sac lay on the posterior abdominal wall and extended from the kidney to the diaphragm, into the thorax, a distance of about 30 ctm. Incision being made, there escaped many hundred vesicles, but no fluid. Whether the diaphragm was perforated or not could not be determined. The uppermost wall of the sac, situated at about the third rib, could be only reached with a probe. Three drainage tubes introduced. Wound closed, excepting for a space of 6 ctm. Operation lasted one and a half hours.

During the following seven days the patient's condition caused much anxiety. The pulmonary catarrh increased, enormous quantities of muco-purulent masses were expectorated, and the temperature rose considerably. On the fifth day symptoms of pulmonary oedema developed, but disappeared on the administration of stimulants. Urticaria also developed. On the eighth day sutures removed; the drains allowed to remain. No irrigation of the cavity. Patient now made rapid progress towards recovery. Four weeks after the operation the drains were shortened. The abdominal wound, however, was not entirely closed until about the 5th month.

CASE III. Female, æt. 30, strong and well nourished. Complains of pain, feeling of pressure and fulness in the epigastrium for the past three months. The right half of the abdomen and the lower portion of the thorax on the right side bulges considerably. An elastic tumour felt in the abdomen, reaching from the axilla nearly to the umbilicus. Size of liver about normal. Puncture shows the presence of echinococcus fluid. Whether the echinococcus was attached to the kidney or the right lobe of the liver, could not be ascertained. On the outer side of the left thigh (lower third) was an exceedingly hard subfascial tumour, about the size of a hen's egg. Operation: Incision parallel to the external oblique muscle, from the axillary line near the ribs, reaching to the tumor. The latter proved to be the right lobe of the liver. This was pushed to the left and sutured to the upper and lower angles of the wound, completely shutting off the peritoneal cavity. The sac, lying behind the liver, was then opened, there escaping about



one litre of watery fluid, containing a few vesicles. The sac was firmly stitched to the abdomen and drains introduced. Incision made into the small, hard tumour on the thigh, gave vent to circa 50 small vesicles. Both operations lasted about 30 minutes. The wound and cavity healed up rapidly, having completely closed with granulation tissue in six to seven weeks. No irrigation of the cavity was made. Secretion very slight. Complete recovery.

CASE IV. Male, æt. 34, ill for some ten years with symptoms of liver disease. Repeated attacks of icterus and dyspepsia, accompanied by swelling of the abdomen, which latter has steadily increased. Patient is greatly emaciated. The lumbar vertebræ curve to the right. The abdomen is more distended in the right half than in the left. Over the whole right half of the abdomen absolute dulness, also over almost all the left half. Dulness of liver begins at the third intercostal space. Diffuse râles over both lungs. Heart greatly displaced upwards. The tumors in the abdomen are hard and elastic to the touch. No fluctuation or hydatid fremitus. Operation: Incision parallel to the external oblique muscle, beginning at the margin of the ribs on the left side, about 30 ctm. in length, and exposing the cyst, which had been previously fastened to the abdominal wall by means of sutures. About six litres of vesicles of different sizes escaped when the sac was opened. The latter extends obliquely upwards as high as the diaphragm behind the liver, for a length of 40 ctm. The diaphragm is pushed up so far that the whole forearm may be introduced before the uppermost point of the same is reached. Liver greatly displaced to the left and adherent to the anterior wall of the abdomen. The enormous cavity of the sac extended on the left nearly to the spleen. It was impossible to remove all the vesicles there, many being held too firmly by the aspiration of the lungs. Three large drainage tubes, about 40 ctm. long, were introduced, and the anterior walls of the sac stitched firmly to the abdomen. A contra-opening for the secretion in the lumbar region made, and another drain inserted in this. The abdomen, although much reduced in size after this procedure, was still very much enlarged. Bi-manual examination through the opened sac discovered the presence of isolated cysts, parent vesicles, under the

ribs of the left side and in the left iliac fossa. Incision and drainage. Operation lasted one and three-fourths hours. During the entire protracted convalescence patient was free from fever. For three and a half months after the operation the secretion of bile from out the cavity was remarkably profuse. No trace of bile visible in feces. The cavity healed very slowly, and when the patient was discharged in two months, the right cavity still contained the drains, and the epigastrium was still swollen. Six weeks later removal of drains, when cavity closed rapidly. The subjective and objective condition, however, was not satisfactory, and it was feared that a retention existed in the sub-diaphragmatic cavity, leaving it doubtful whether echinococci would not again appear. Patient, however, went about his accustomed work as usual.

Many echinococci in this region grow directly into the abdominal cavity, causing atrophy of the liver parenchyma; others, by their increasing size, bring about a strong rotation of the liver around its horizontal axis, and so great a displacement downwards that they eventually are found entirely in the abdominal cavity in contact with its muscular walls. These cases are, of course, easy of access to diagnosis and treatment, as compared with those lying just in front or just behind the coronary ligament. With the increase of size of these echinococci upwards, the consequent dislocation of lungs and heart, symptoms of very dangerous character in respiration and circulation appear, of purely a mechanical nature. The diaphragm, in some cases, becomes perforated by pressure of the echinococcus, sometimes into the pleural cavity, oftener into the lungs; occasionally also into the pericardium, causing death. In Davaine's statistical report we find nine cases of perforation into the pleural cavity and twenty-one cases of perforation into the base of the lungs or bronchi. Symptoms consequent to the displacement of the abdominal organs necessarily follow, such as dyspepsia, nausea, vomiting, etc., also periods of pain, caused by pressure on the nerves. In some cases the marasmus is so great in consequence of these troubles, that the patients have the appearance of being afflicted with some malignant disease. Icterus from closure of the gall-duct is also present at times. The consistency of

the echinococcus sac is usually very great and especially so in those cases where the sac is surrounded by the liver substance. This fact renders it liable to be confounded with carcinoma. The firm consistency of the cysts undergoes a change only when these perish or when the young cells contained in the parent vesicles burst (from trauma, puncture, etc.), leaving an intermediate fluid between the vesicles. The great vehemence, with which the cysts gush out on opening the sac, shows how great the intracellular pressure must be. The author does not consider the so-called hydatid fremitus a reliable symptom of the presence of echinococci. The only certain means of diagnosis is the puncture of the cyst. When, in the region of the bony thorax, a clear watery fluid is obtained, which on being boiled gives no precipitate with acetic or nitric acid, or arg. nitricum in other words, contains no albumen or sodium chloride, the diagnosis is clear enough, even though the microscope shows no hooks or scolices. The same clear fluid, containing but a trace of albumen, is only found in hydronephrosis and cysts of the broad ligament. The author calls attention to the very frequent appearance of urticaria after puncture of the sac, an affection supposed by some authorities to be caused by the succinic acid always present in echinococcus fluid. He considers the appearance of this cutaneous affection a symptom of considerable diagnostic value. As regards operative treatment, much will depend on the position, etc., of the echinococcus sac. When this has not extended in its development into the abdominal cavity proper, but backwards against the posterior wall, pushing the diaphragm upwards and the liver downwards, author makes his incision in the axillary line, beginning slightly above the margin of the liver and running about 10 to 15 cm. in length. The liver is then stitched firmly to the lower angle of the wound and the sac opened. In cases where the echinococcus lies anteriorly to the coronary ligament, growing towards the anterior wall, the liver being generally anteverted, the author incises parallel to the right curve of the ribs, if the echinococcus is more on that side of the abdomen. If the sac on the contrary lies more to the middle or left side, incision should be made in the linea alba, as in Case I.

The after-treatment is simple. The sutures are removed in the

course of six to nine days. Complete union of the sac and wound edges will be found. Landau does not irrigate the cavity of the sac at all, and the same drains, gradually shortened, remain until almost entire obliteration of the sac takes place. Suppuration did not take place in any of his cases, only some slight amount of muco-serous secretion. Regarding the nature and cause of the profuse bile secretion in these operated cases, there are many different opinions. Küster thinks that it is owing to a septic condition. Genzmer and Leisrink, also Korach believe that it is caused by echinococci penetrating into the larger biliary vessels, respectively, by the rupturing of a large biliary vessel. Israel considers the exfoliation of the connective tissue sac to be the real cause. The author finally is of the opinion that this secretion is dependent on the celerity and intensity with which the connective tissue capsule surrounding the parent vesicle exfoliates, exposing thereby echinococci of the liver together with biliary vessels. The microscopical examination of an operated case of this kind of Wechsellmann's showed that the whole connective tissue capsule of the parent vesicle was richly supplied with biliary vessels, running partly parallel to the sac, partly penetrating this directly, at right angles. This fact, the author thinks, substantiates his theory. The secretion of bile into the sac ceases only when the wounded surface of the liver heals over. In none of the cases of the author has this profuse secretion of bile in any way given rise to injurious consequences.—*Deutsch. Med. Wochens.*, Nov. 25, Dec. 2 and 9, 1886.

C. J. COLLES (New York).

**V. Notes of a Case of Gastrostomy.** By G. A. HAWKINS-AMBLER. This operation, which was successful when reported August 21, 1886, was performed on December 17, 1885, by Dr. Kilner Clarke, of Huddersfield, at Dr. Hawkins-Ambler's suggestion. For two years previously the patient had suffered from a gradually increasing stricture of the œsophagus located at the level of the upper border of the manubrium sterni. It was diagnosed to be malignant. A severe attack of hæmorrhage came on very suddenly on November 14, 1885, and Dr. Ambler was called in. By December 17 the patient had suffi-

ciently recovered to undergo the operation. The margins of the stomach were first percussed out, and then an incision was begun three-fourths of an inch above the margin of the ribs and carried four inches downwards, in the line of the rectus, "one and one-half inches internal to the left nipple line, viz., one-half inch to the inner side of the linea alba. The fibres of the rectus were separated with the handle of the scalpel, the peritoneum opened, and the stomach recognized and drawn forwards. Two silk loops were inserted into the stomach at an interval of one-third inch apart at its most presenting part, and four silk sutures on either side, each traversing one-half an inch of the serous and muscular coats of the stomach, brought its wall into close contact with the margins of the wound," leaving exposed a piece of stomach the size of a sixpence. "The peritoneum was united with carbolized catgut sutures," and the margins of the wound brought together above and below the loops in the stomach. A small drainage tube was put into lower part of wound. Antiseptic precautions during operation and in subsequent dressing. Ether was tried at first, but chloroform was substituted for it on account of tumultuous action of the abdominal muscles. The wound was dressed under the spray every second day until the 5th, when the stomach was opened. At the second dressing the drainage tube was removed. "The patient was fed every two hours with Slinger's suppositories, which proved of great value, and injections of peptonized milk and other foods alternately, all of which were retained. The rectum was washed out with warm water prior to each nutrient injection, and the bowels were relieved daily." Before opening the stomach its cavity was dilated by an effervescing draught given in two parts separately by the mouth. After the incision a piece of No. 9 gum elastic catheter was inserted, and some of Benger's food injected. Leakage occurred at each feeding at first, but this became gradually less as the wound contracted. On January 25 there was merely a round aperture for Krohne's apparatus.

Digested foods, beef-tea, eggs, wine and whiskey are administered every three or four hours to the extent of a pint each time, and there is no gastric discomfort. \* \* \* The gain in strength and comfort resulting from the operation is most marked and gratifying, and there

can be no question that life has been considerably prolonged by it." The points to which Dr. Ambler calls especial attention are: (1). Percussing out the stomach before the first incision. (2). The advantage of its direction parallel to the rectus. (3). The dilation of the stomach by the effervescing draught previous to its being opened.—*Lancet*, August 21, 1886.

C. W. CATHCART (Edinburgh).

**VI. Laparotomy for Pistol-shot Wound of the Stomach: Perforations of Small Intestine not Recognized during Life. Death.** By CHARLES K BRIDGON, M. D. (New York). A woman had accidentally shot herself two hours before admission to hospital; the wound was  $3\frac{1}{2}$  inches above the umbilicus and  $\frac{1}{2}$  inch to the left of the median line. Owing to absence of urgent symptoms, the operation was delayed until the following morning, at which time, the temperature was  $102^{\circ}$  Fahr. and the general condition about the same as the night before. The abdominal wall was disinfected by the application of sublimate solution, and afterward of a saturated solution of iodoform in ether; the sponges were kept in a warm sublimate solution, 1-5000. Under ether, an incision was made from the ensiform cartilage to the umbilicus through at least three inches of fat; when the muscular layer and posterior sheath of the rectus were divided, another thick layer of fat was exposed, on division of which the peritoneum appeared, was nicked and divided the whole length of the wound. On pressing the stomach downward, some bloody serum was found, and in the deeper veins a fluid, which it was thought, had a milky appearance. The cavity was so deep that an attempt was made to obtain a better view by drawing out the omentum and transverse colon and laying them, enveloped in warm flat sponges, on the lower thoracic wall; this failing to give sufficient room, the opening in the abdominal wall was enlarged downward to a point midway between the umbilicus and the pubes. The omentum and colon were now returned to the abdominal cavity and maintained there by flat sponges; the stomach was again examined and there was found a small rent in the omentum close to its attachment to the greater curvature. This was



enlarged by the fingers sufficiently to admit a thorough inspection of the space behind the stomach where were found a few coagula of blood. After a prolonged search and examination at that portion of the greater curvature from which the omentum was detached, there were found two linear slits, with ragged edges communicating with the interior of the stomach, one of these being situated anterior, the other posterior to the insertion of the omentum, and not a half inch apart.

At this time the condition of the patient was critical, and the indications were to conclude the operation as quickly as possible. Hypodermatics of camphorated ether were used. The perforations were closed by two lines of Lembert's sutures. As there was a little adherent omentum at either end of the second row of sutures, a deeper suture was carried through at that point so as to include this, the toilet of those parts above the transverse colon carefully made and some grumous blood and what was supposed to be stomach contents removed. Tamponades of iodoform gauze were introduced, one into the space behind the anterior layer of the omentum, the other into the space outside of it. The abdominal walls were brought together by a number of silver-wire relaxation sutures and intermediate ones of catgut. The superficial dressing consisted of iodoform and bichloride gauze. The operation lasted two hours. The patient's condition was not very promising, and she was immediately placed in bed and surrounded by hot bottles.

She rallied well from the ether and did well for the remainder of the day, but on the ensuing day her temperature rose steadily and rapidly to 106° Fahr. with pulse at 150 and respiration 15; pulmonary œdema appeared at 9 p. m. and death supervened at 11:45 p. m.

The autopsy showed signs of acute general peritonitis with recent adhesions throughout the cavity, in which about 5 viii of watery, greenish-brown liquid, thought to be fæcal, was found. The stomach wounds were found to be in good condition, but following the small intestine past the duodenum, four wounds were found in the upper part of the jejunum, all within a distance of three inches; the course of the bullets could easily be traced by several ecchymotic spots in the tissues; its direction was downward, backward and outward, and it

was found anterior to the left kidney, in the left axillary line and about one inch below the line of the umbilicus. During the time that the stomach wound was being sewed up the indications for a rapid operation were urgent, and it was probably due to this cause that the wound of the intestine was not recognized. In future the operator would regard none of his operations as complete until the whole of the intestinal tract had been examined from one end to the other.—*N. Y. Surgical Society*, Dec. 8, 1886.

**VII. The Danger of Hypodermic Injections of Morphine in the Treatment of Strangulated Hernia.** By M. ROUTIER (Paris). During the preceding year the writer had operated twice for strangulated umbilical hernia; the first operation was performed twelve hours after the strangulation and was a perfect success. He was not called to the second until five days after the onset of the trouble, and found gangrenous points scattered along 75 cm. of intestine; he resected the entire affected part, but the patient soon died. This patient had been treated with injections of morphine, which had relieved the pain and arrested the symptoms, and thus caused the grave error of permitting fatal temporization. He has since ascertained that the use of injections of morphine is very common in strangulated hernia. Various cases have been published in favor of this treatment, but none are convincing; it is impossible to understand how morphine can favor spontaneous reduction; in that case it would be necessary for the strangulation always to lie in the ring and for the relaxation of the muscles to have an influence upon it, which is doubtful. Nothing then is farther from being proven than the good results of this treatment; on the contrary, its dangers are self-evident, since, by diminishing pain and vomiting, it permits temporization which is always exceedingly dangerous, for the operation is acknowledged to be the more dangerous as it is delayed. The treatment of strangulated hernia by morphine should be very energetically rejected, and it should be held as an axiom that a patient with strangulated hernia should not be left until relieved.—*French Congress of Surgery, Revue de chirurgie*, November, 1886.

**VIII. Surgical Intervention in Non-strangulated Epigastric and Ad-umbilical Hernia.** By F. TERRIER (Paris). By the expression, epigastric and ad-umbilical hernia, the author refers to hernia lying at the linea alba in the epigastrium and about the umbilicus. These hernias are of two principal varieties; (1) Hernia properly called, containing omentum or intestine, and sometimes both; (2) Fatty hernia, which sometimes coexists with hernia proper. All classical authors declare surgical intervention in this class of tumors to be contrary to the dictates of good surgery. The author combats this dictum and, in support of his position, details four cases in which he has operated upon such tumors with success, and quotes successful operations by Czerny, Maunoir, Reverdin and Banks. He further subdivides the lesions for which operative interference is indicated as (*a*) fatty hernia, with or without a central diverticulum, (*b*) fatty hernia surrounding a peritoneal sac containing an omental hernia, (*c*) simple omental hernia and (*d*) finally and more rarely intestino-omental hernia. Whatever the lesion, the method of radical cure is the same in the first steps; the latter steps vary according to the nature of the hernia and possible complications, particularly adhesions.

The most minute antiseptic precautions being taken, a vertical incision should be made through the integument of the hernia. Sometimes this is sufficient, sometimes, however, it becomes necessary to combine with it a horizontal incision, giving rise to four flaps. The integument dissected up, the surgeon generally comes upon an abundant cellulo-fatty tissue, sometimes forming a veritable lipoma; this tissue should be dissected and isolated down to the adjacent aponeurotic layers, *i. e.* to the fibrous ring, to the margin of which it is generally adherent; this dissection made with care, it is of advantage to incise this lipoma or pseudo-lipoma from above downward, layer by layer, to see that there is no peritoneal sac more or less developed in its centre; the existence of such a sac seems to be quite frequent, and while it may be empty, constituting a simple serous diverticulum, it may be filled with omentum, adherent to its walls or the neck of the sac or not.

In case of simple peritoneal diverticula, the lipoma or fatty hernia should be resected and the diverticulum sutured so as entirely to close

the peritoneal cavity. Then the margins of the ring should be freshened and sutured, together with the skin.

If the hernial sac, more or less lined with fat, is filled with omentum, it should be freely incised and the omentum reduced if non-adherent, or its adhesions destroyed, drawn out a little, ligatured with catgut by two or three loops arranged X-like, resected, and the stump reduced. The hernial sac and the fat lining it should then be resected so that only the fibrous ring is left. Then, as in the preceding case the margins of the ring should be freshened; sometimes it is preferable to transform it into an ellipse by resecting its upper and lower edges; this form permits the better apposition of the opposite margins. Finally the ring should be sutured with catgut, when the opening is not too large and silver wire, when it is necessary to make a little effort on the neighboring parts in order to occlude the orifice. The entire abdominal wall, not omitting the peritoneum, should be included in each of the sutures, except in the case where a separate suture is applied to a small peritoneal diverticulum; it is well to add superficial sutures to perfect the union of the skin, especially after crucial incision.

If the sac contains at the same time omentum and intestine, the procedure is still simple in theory. The integument should be incised vertically or crucially and the hernial sac, more or less lined by fat, should be opened, taking care not to wound the omentum and especially the intestine, which may be adherent; when the gut is free in the sac, it should be reduced and kept reduced with a sponge held by forceps in the fibrous opening; in the contrary case, the intestine should be liberated by a careful dissection, which is often difficult. Then the omentum should receive attention; if it is non-adherent, it should be reduced like the gut and kept so with a sponge; if adherent, it should be treated as in the simple adherent omental hernia.

In all the cases reported, the result was excellent in that the patients were relieved from pain and gastro-intestinal complications; in three of the author's cases, a slight hernial point persists, which is, however, perfectly controlled by a bandage, and does not discommode the patients. In the case of Maunoir, Czerny and Banks no ulterior eventration is mentioned; however, the subjects were required to wear a

bandage. In the author's third case and in Reverdin's case, there was no ulterior eventration. He concludes :

1. Fatty hernia of the linea alba, sometimes determining troubles of the digestive apparatus, can be treated by excision with primary union of the ring, through which they have protruded, and the integument which covers them.

2. Hernia proper, omental, intestinal or omento-intestinal, determining gastro-intestinal troubles, sharp pain or annoying deformity, should be treated like other varieties of hernia—a radical cure should be sought for by reduction, excision of the hernial sac, freshening of the ring, and suture of the abdominal wall, ring and integument *en masse*—*Revue de chirurgie*, Dec., 1886.

**IX. The Treatment of Hernia by Subcutaneous Injection.** By W. B. DE GARMO, M. D. (New York). This paper opens with an interesting historical sketch of the operation, and proceeds to a discussion of the Heatonian method of white oak bark injection; after seven years' experience with this procedure, during which he has used it upon upward of one hundred cases, he considers himself justified in claiming for it; 1. Freedom from danger. 2. That about 45 % of all cases can be cured by it, and in selected cases, an average of 75 % can be obtained. 3. That many extreme cases, uncontrollable by means of a truss, can be brought under control by its aid. 4. That it is followed by improvement in almost every instance. 5. That children who have not been cured by mechanical means, can in almost every case be cured by this operation. He calls attention to the error of expecting a radical cure from a single injection in old scrotal hernia where the sac and the surrounding tissues are thickened and changed in character; it should be remembered that in these old neglected cases, there is not only the dilated, shortened canal and thickened sac, which are disposing causes to recurrence of hernia, but a funnel-shaped opening into the upper part of the canal from the abdominal cavity, which is persistent owing to the slowness with which the neck of the hernia is obliterated and during this time, thorough and constant protection must be afforded by mechanical support; in these cases, the

operation must be modified, or such cases should be excluded entirely.

Care should be taken to make the puncture directly through the integument over the abdominal ring and not through the scrotal tissues, as inflammatory action may be much more readily set up in the latter by the fluid following the needle in its withdrawal; another objection to injection through the scrotal tissues is that when the hernial sac is of large size and adherent, the injection is more likely to be deposited within than without the canal; while this accident will do no harm, it will do no good, for the action of the irritant must be upon the canal and not to any extent upon the sac.—*N. Y. Med. Rec.*, Jan. 8, 1887.

### GENITO-URINARY ORGANS.

**I. Nephrotomy for Pyonephrosis.** By FREDERICK LANGE, M.D., (New York). A woman, æt. 33, had had pain in the left lumbar region for years, had developed a leucorrhœa of gonorrhœal origin eight weeks previously, had had cystitis for several weeks and within the last fortnight severe pain had supervened in the left lumbar region where a tumor about the size of a new-born child's head could be felt, exploratory puncture of which revealed pus. Lumbar incision opened a large, pretty smooth cavity covered with a thin mucous membrane, at the bottom of which a roundish, fleshy eminence could be felt and seen, apparently the main portion of the kidney; this was fluctuating, and incision with the actual cautery discharged a moderate quantity of pus; the finger could feel the dilated calices in the cavity. The larger cavity was apparently not in free communication with this main part of the pelvis. Both cavities were thoroughly drained and weak solutions of boric acid used as a wash during the after treatment. Recovery was smooth and cicatrization complete in about eight weeks. From the history of the case it seems probable that hydronephrosis had existed for a long time and suppuration supervened in consequence of gonorrhœal infection.—*N. Y. Surgical Society.* Nov. 22, 1886.

**II. Nephrectomy for Pyonephrosis.** By FREDERICK LANGE, M.D., (New York). A man, æt. 38, had for two years increasing pain and discomfort in the right hypochondrium, and on bimanual palpation



a tumor about the size of the two fists could be felt immediately below the liver and behind the intestine; fluctuation could be obtained; exploratory puncture produced thick odorless pus, and pus was found in the urine. Lumbar incision exposed a pyonephritic sac which was incised with the thermo-cautery, giving issue to a great quantity of pus; digital examination showed that the whole swelling consisted of numerous pus cavities, mostly from one-half to two inches in diameter, that it extended pretty high up toward the diaphragm, and that as a secretory organ it could not have any value. In view of the advanced degeneration and the quantity and quality of the urine, the conclusion seemed justified that the opposite kidney must be comparatively healthy, while the pus must be mainly delivered from the right side, and nephrectomy was accordingly done, the adhesions of the capsule being quite extensive but not difficult to separate, and the kidney was brought out in spite of its size, which had been a good deal diminished by the evacuation of the pus, without adding any cross-incision, as had been necessary in former cases. It was difficult to secure the pedicle, which was short, thick and overlapped by the mass of the organ, but a preliminary elastic ligature was applied and the kidney cut away far in front of it, giving free access to the insertion of the ureter and the vessels; a double ligature was then applied behind the elastic ligature, the pedicle severed, iodoform sprinkled over the stump, the actual cautery applied, the ligature left long and no sutures applied because sloughing and suppuration were feared in view of the field of operation having been swamped by pus and some infiltrated tissue remaining in the pedicle. The pedicle did not slough and four weeks after the operation the ligatures were extracted with the exertion of some slight force, but no piece of tissue had ever been discharged, which could possibly have been the tied-off, thick, fleshy pedicle. He did not suppose the latter was continuing an organic life, but thought it probable that it was gradually digested by the environing healthy granulations in the same manner as the aseptic blood coagulum was gradually consumed or aseptic pieces of organic tissue were annihilated by healthy tissues. The urine became almost normal in thirty-six hours. Weak sublimate solutions were used mainly during after treatment and the

patient was discharged with a healthy granulating wound five weeks after the operation.—*N. Y. Surgical Society.* Nov. 22, 1886.

## BONES, JOINTS, ORTHOPÆDIC.

**I. Operative Intervention in Irreducible Traumatic Dislocations.** This was the order of the day on the fourth day of the last French Congress of Surgery. M. MOLLIÈRE (Lyon) remarked that for the small articulations like those of the fingers, the question is simple; arthrotomy may be performed with certainty of obtaining a mobile articulation.

For the shoulder, subcutaneous section may be employed, a fine tenotome being introduced under the skin and passed all about the head; he had obtained 7 successes by this method. When the head is at the same time broken and dislocated, the best plan is to introduce the superior extremity of the lower fragment into the glenoid cavity. In certain cases of irreducible dislocation it is logical to fracture the humerus and he recommends it. The establishment of a pseudarthrosis should not be attempted, but the mere reduction of the inferior fragment into the glenoid cavity.

Of the elbow, every dislocation unaccompanied by articular deformity can be reduced; by applying the grip of the osteoclast considerable force can be exerted; by this means, he had been able to reduce a dislocation of a year's duration. When the triceps opposes mobility, the olecranon may be fractured without destroying the expansion of the triceps tendon. He absolutely rejects subcutaneous section. Arthrotomy and reduction may be done, but if there be osseous deformities, it is better to perform resection; partial resection is better, humeral resection is generally sufficient. In every case the olecranon should be preserved because of its effect on the function. He had seen patients who had used their arms at the end of a month. In young subjects it is preferable to resect a little of the periosteum. In all, immediate union should be sought for, in default of which, there is danger of the formation of inconvenient osteophytes.

In case of backward dislocation of the foot, a cutting operation is

unnecessary; supra-malleolar osteoclasis is sufficient. This was done in a man of 73. At the end of 60 days he walked perfectly.

M. TRELAT (Paris) had in his service a year before a man, *æt.* 51, affected with iliac dislocation of the hip of direct causation, dating back  $6\frac{1}{2}$  months. Whenever the patient placed his foot on the ground and attempted to bear his weight upon it, it would flex, so that locomotion was almost impossible. All efforts at reduction by manipulation and force having failed, in view of the age of the patient, as the limbs were parallel with but 4 cm. shortening, and as there was reason to hope that the pain and with it the weakness would diminish with time, he performed no operation. He has collected but 5 cases of this kind, in which there were two deaths, two resections of the head and his own case. In one case, of six weeks duration (Polaillon's case) reduction was obtained by the operation, but the patient died. There are no recorded cases of cure by reduction of an ancient dislocation of the hip, by operation. He concluded: (1) a prompt and exact diagnosis is necessary in dislocation of the hip; (2) immediate reduction is necessary, by manipulation if possible, that failing, by force; the efforts should be renewed and varied; (3) if, notwithstanding all attempts, failure has to be acknowledged, the patient must not be abandoned at this still favorable period; this is the time when subcutaneous section of ligaments and muscles and even arthrotomy may permit reduction; (4) after two or three months, manipulation and the employment of very gentle force alone give any chance of reduction; (5) in case of ultimate failure, the variety of dislocation and the position of the limb should be considered; (a) if it be in extension and standing is possible, the best plan would be to favor the formation of a nearthrosis; (b) if the limb is flexed and standing impossible, osteoclasis or even osteotomy, with straightening of the limb would be the resort; (c) if, besides the vicious position, the head of the femur, more or less deformed, is the seat of permanent pains, resection would be the better procedure.

M. VERNEUIL (Paris), in attempting the reduction of an ancient subpubic dislocation, had fractured the neck of the femur, the head was left under the skin like a small apple. He was able to give the limb an excellent position and the result was very satisfactory.

M. BOUILLY (Paris) had succeeded in reducing two dislocations of the elbow, of respectively  $4\frac{1}{2}$  and  $8\frac{2}{3}$  months standing, in a child of 9 and a woman of 40 years by the use of the extension apparatus of Hennequin. In a case of obturator almost perineal dislocation of the hip of three months duration, so pronounced that in the sitting posture the patient's knee touched his chin, unsuccessful efforts at reduction were made, but during the manipulations, the femur was accidentally fractured at the juncture of the upper and middle third, giving a useful limb; in a similar case he would prefer osteotomy.

M. OLLIER (Lyon), after referring to the infrequency of resections in dislocation of the shoulder, but four cases being known to him, related a case of complete intra-coracoid dislocation; six months after the accident, he made an unsuccessful attempt at reduction; three months later he performed arthrotomy; having made the usual incision and exposed the head, he divided everything which could hinder reduction; the capsule and the head were under his eye but he could not get the head into the glenoid cavity. He then removed 43 mm. of the humerus, which exposed a portion of the capsule pressed down into the glenoid cavity and forming a sort of meniscus, which filled it; this was incised. The muscles had retracted to such an extent that it was difficult in spite of this resection to bring the superior extremity of the humerus into the glenoid fossa; it was necessary to immobilize the arm in a special attitude to obtain the humero-glenoid pseudarthrosis; it was placed in adduction, the elbow on the chest, and retained for two months. Notwithstanding an attack of general articular rheumatism at the moment when it was desired to begin motion, a perfect result was obtained in eight months. He particularly emphasized the tendency of the superior extremity of the humerus to push forward; precautions should be taken against this tendency, to avoid a coraco-humeral articulation which is indisputably inferior to the gleno-humeral articulation.

From an operative standpoint, three classes of dislocation of the shoulder should be distinguished, (1) dislocation forward, (2) dislocation downward and (3) dislocation backward. Of the latter there are no known cases. For the first, incision as for resection is indicated.

For the second. Langenbeck has made an incision in the axilla and the patient was cured, but he had been lost to sight and the ultimate result was unknown. However, even in cases where the head protrudes in the axilla, the ordinary incision for resection should be adopted, because it alone permits good examination of the glenoid fossa, which is indispensable.

M. DECES (Rheims) had performed arthrotomy for an irreducible backward dislocation of the elbow of three months standing; the result was good, notwithstanding a little suppuration, supination and pronation being easy, although flexion and extension were incomplete. In another similar case, a favorable result was also obtained. He considers the best operative procedure to be: a T-shaped incision, the horizontal line passing from epicondyle to epitrochlea and the other perpendicular to it on the tendon of the triceps; the ulna is isolated and the tendon of the triceps and then the lateral ligaments are divided, when the entire articulation is visible.

M. TRIPIER (Lyon) had recently operated in two cases of dislocation of the shoulder with fracture of the humerus. In the first case, it was easy to recognize symptoms of the fracture and at the same time to ascertain that the head was below the coracoid process, showing that there was at the same time fracture and complete subcoracoid dislocation. Attempts at reduction failed, but it was observed that pulsation was absent in the radial artery. Some time later it was noticed that pulsation was completely lacking in the axillary but present in the brachial; this decided him to operate. Incision found the capsule intact; two pieces of bone were locked between the head and the cotyloid cavity; failing to extract these otherwise, the head was removed, from which a good cure with an excellent functional result was obtained. The cause of the vascular troubles apparently was not ascertained, although they were evidently relieved.

The second case was a man of 55, who had been thrown by a horse, dislocating the head of the humerus. Six days later, after ineffectual treatment by a physician, he entered the hospital, gangrene having already appeared in the hand and forearm. On performing disarticulation of the shoulder, the head was found below and within the cora-

coid process, but buried deeply at the anterior and inferior part of the glenoid fossa, which was covered by pieces of bone corresponding to the tuberosities, which had been torn away; these were removed. The patient being already infected with gangrene, the operation was not sufficient to stop the advance of the process; death supervened in a few days. It seems difficult to say whether in this case there was a primary or a secondary arterial lesion.

From these two cases he draws the following conclusions: (1) If vascular troubles exist, the surgeon should abstain from every kind of manœuvre of reduction; the operation alone permitting the reduction or the extirpation of the dislocated part, will sometimes be sufficient; in case of a simple wound of the artery, it should be ligatured in the wound; in case of aneurism, it would perhaps be preferable to ligature the subclavian; gangrene, according to circumstances, demands immediate or later disarticulation or amputation. (2). If there be no vascular troubles, except there be a contraindication in the general condition, reduction should be attempted; in case of failure, the surgeon is justified in operating, provided the fragments be in relation with one another; in the contrary case it is preferable to resort to manipulation, extirpating the dislocated part later, if necessary.

M. MAYDL (Vienna), in the treatment of five cases of ancient dislocation of the elbow, had been confronted by the following questions: (1) The choice of incision for arthrotomy; (2) the operative procedure, *i. e.*, whether to be content with a simple arthrotomy or to resort at once to resection; (3) the method of dressing and treatment after the operation. In the most common dislocations (backward and outward), we have a choice between (*a*) the longitudinal incision of Langenbeck, (*b*) the transverse incision of Volcker, (*c*) the two lateral incisions of Heuter and (*d*) two incisions on the sides of the olecranon. The longitudinal incision and the two lateral incisions of Heuter do not give light enough. The transverse incision gives free access to the joint, but it impedes the mobilization of the articulation at the beginning, and condemns it to a long rest, the consequences of which are harmful; accordingly, in his last case, he had made two lateral incisions of 6 cm.; stripping up the periosteum with the soft parts,



enough light was obtained to avoid all danger of wounding the ulnar nerve. As far as possible, it is desirable to abstain from resection and reduce by simple arthrotomy. Sometimes it is difficult to maintain the reduction after having secured it: in one case he drove two nails into the trochlea to prevent the olecranon slipping backward. In conclusion, he would leave the wound open to avoid the accumulation of serum and the possibility of suppuration in the joint; passive motion should be begun in the third week.

M. SEVREANO (Bucharest), in a case of ischiatic dislocation of the femur, in a female æt. 20, was unable to obtain reduction, although he had exerted upon the limb traction to the extent of 400 kilogrammes, and, making an incision over the joint, he discovered that the capsule, twisted upon itself, masked the acetabulum; he then resected the head and straightened the limb. The patient made a quick recovery, although, as it has been impossible for him to see her again, he cannot report upon the final functional result.—*Revue de Chirurgie*. Nov., 1886.

# THE SURGERY OF THE LUNGS.<sup>1</sup>

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THE customs of the past and the authority of standard authors have established certain well-defined boundaries beyond which, until recently, the surgeon who was guided by tradition either did not or dared not transgress. But quite within the recollection of the writer has arisen a school of operators who, being first well grounded in pathology, have not hesitated to invade the formerly sacred precincts of the peritoneal cavity, the thorax and the brain, and who shall say they have not been justified by their results? In the surgery of the viscera, the prostate and the brain, wonderfully brilliant results have been achieved.

Ardently following these men in theory, and clinically repeating their results as opportunity offers, the writer firmly believes that "nothing venture nothing win" is a proverb which holds good in surgery as in business, and that underlying it is a basis of probability which our duty to our patients requires us to present to them—presenting the matter so fairly that, whether they decline or accept the venture, we are relieved of all responsibility save for operative skill.

Guided ever, then, by this opinion, I venture to present for your consideration some points concerning the surgery of the thoracic wall and its contents. What I have to say may be conveniently comprised under three headings:

Pneumotomy.

Pneumectomy.

Thoracoplasty.

<sup>1</sup>Read before the Medical Society of the State of New York, February, 1887.

It is not a little surprising to find that Hippocrates wrote clearly and unmistakably not only of abscess inside of and outside of the lungs, but of its surgical treatment. The opening was to be made at the seat of the greatest pain and swelling, at the same time as low as possible, first with a scalpel, then with a bistouri. This was, in effect, the same as our operation for empyæma by simple incision. The cavity was to be kept open by a tent, and washed out morning and evening.

In spite of his precepts, however, it was not until nearly the beginning of the eighteenth century that physicians saw fit to carry out his advice. Even then it was readvanced with hesitation. But about one hundred years ago Pouteau, David and Calisen added the weight of their own convictions, and were followed in due time by Richerand, Lang, Breschet, Macleod and numerous others. But only in our time have systematic experimentation and operation been carried out; notably by Mosler,<sup>1</sup> of Greifswald, W. Koch,<sup>2</sup> of Dorpat, and E. Bull,<sup>3</sup> of Christiana. Pneumotomy is thus shown to be really of ancient origin. On the other hand, pneumectomy—resection of a part or the whole of one lung—is in every respect an operation of the past decade, while the thoracoplastic operation of Estlander is but a little older.

#### PNEUMOTOMY.

To speak now of these operations more in detail, let us first take up pneumotomy. Under this term we include the opening—by knife or cautery—and drainage of a cavity in the lung substance or connecting with its interior; that is, we may have mediate or immediate pneumotomy. Just in proportion to the adhesion of the pulmonary to the costal pleura, around or over the lesion, is the operation one of comparatively small hazard. It is indicated in the following conditions:

1. Bronchiectatic abscesses.
  2. Tuberculous abscesses.
  3. Gangrene of the lungs.
  4. Pyo-pneumo-thorax.
  5. Hydatid cysts.
  6. Foreign bodies.
- } When they can be localized.

<sup>1</sup>Berl. klin. Wochschft., 1873, X, 43; 1883, XX, 12.

<sup>2</sup>Arch. klin. Chir., 1873. Deutsch. Med. Wochschft., 1882, p. 440.

<sup>3</sup>Nordiskt Med. Ark, 1881-3. Copenhagen Int. Med. Cong., 1884.

*The operation.*—Except when there are no adhesions this is one of no difficulty. The existence or absence of adhesions can be frequently foretold by the insertion, over the lesion, of a long needle into the lung substance. When the lung is not bound fast to the thoracic wall the needle end will be seen to make a more or less extensive excursion, whereas if adhesions be present, it will be seen to move only with the thorax. So a pneumotomy in a case with adhesions, while requiring probably a costectomy, may yet be one of the simplest of operations, but pneumotomy in a case without them would require probably more or less extensive resection of the thorax wall.

In the former case the suppurating or gangrenous cavity having been located as accurately as possible, and perhaps marked out on the chest surface with a brush dipped in tincture of iodine, everything is made ready as for any aseptic operative procedure. After suitable incision two or three ctm. of one or more ribs are resected, and the pleura exposed. At this point timidity or good judgment may lead to the introduction of an aspirator needle, it being inserted till it reveals the exact direction and depth of the cavity sought for. According to the taste of the operator or the conveniences at hand, he will either go boldly down with the needle as his guide, or will feel his way along by its aid. For this purpose the majority probably would prefer the thermo- or galvano-cautery, since without reference to blood-vessels (which can be easily seized) it may be expected to so sear the freshly opened tissue as to lessen danger of absorption. The cavity now exposed, the passage thereto may be enlarged or dilated to any desired extent, with or without removal of more of the bony wall.

Great caution is now called for in the cleansing of the cavity. The irrigating stream that might wash out its contents might also drown the patient. Better then to gently swab it out and use some disinfectant in dry powder, or to simply leave it to drain and cleanse itself. A large size drainage tube may be inserted, with a thick, absorbent, antiseptic dressing properly arranged and protected. According to the location of the lesion and its artificial opening it may be advisable to keep the patient lying on his side, back or face.

In those cases which seem to call for pneumotomy, yet in which no adhesions can be diagnosed, it has been proposed to induce them by some vigorous irritation. Thus Krimer (1830) advised the application of powerful caustics; while Godlee recently has suggested multiple punctures. On the other hand, others like Barry or Graux have proposed to sew the lung to the external opening as the stomach is sewed to the front in cases of gastrostomy.

If the cavity is to be washed at all, salicylic acid solutions would seem to be most suitable for the purpose, and have been especially extolled by Mosler.

*Results.*—In his essay<sup>1</sup>—to which I acknowledge no small indebtedness—Truc has collected statistics of forty-eight cases of pneumotomy for different lesions. To these I am able to add some collected from other sources or since reported, thus making a total of eighty-four, classified as follows:

	CASES.	DEATHS.
Bronchiectasis, - - - - -	23	9
Tuberculous abscesses, - - - - -	13	6
Gangrene, - - - - -	14	6
Pyo-pneumo-thorax <sup>2</sup> , - - - - -	1	1
Hydatid cysts, - - - - -	32	4
Foreign bodies, - - - - -	1	0
	<hr/> 84	<hr/> 28

The mortality rate then is a trifle over 32%. Viewed from one standpoint, this seems, perhaps, too large; but seen in its true light, this means saving 68% of lives that without it would be lost. This, I take it, is no mean showing.

#### PNEUMECTOMY.

Resection of a part or the whole of one lung implies one of those bold operative attacks which only the genius of our era could conceive and the hardihood of our surgeons carry out.

What we at present know of the possibilities in this direction we owe largely to the experimental studies of five men.

<sup>1</sup>Sur la chirurgie du poumon, Paris, 1885.

<sup>2</sup>See my report of Case III at close of this paper.

luck,<sup>1</sup> Marcus,<sup>2</sup> Block,<sup>3</sup> Schmidt<sup>4</sup> and Biondi.<sup>5</sup> Taking the experiments of Block, of Danzig, as fairly representative of work in this line, permit me to briefly allude to some of his work. At the Eleventh Congress of German Surgeons (1882) he summarized the results of operative attacks on some sixty animals of all kinds. Several living animals (dogs) were shown to those present which had undergone partial or total resection of one lung. Numerous preparations were demonstrated exhibiting perfect readaptation of the lung within the thorax after removal of one lobe.

Block's method did not include resection of one or more ribs, but consisted of intercostal incision with dilation of the opening, withdrawal of the lung, and ligature and removal of as much as desired. In almost every instance the wound healed without change of the first antiseptic dressing. Among other things made evident by these and similar experiments is that traumatic atelectasis of one lung is by no means necessarily fatal. It happens in some animals that there is a natural mediastinal communication from one pleural cavity to the other; in such an animal the operation must fail, otherwise not. In fact it is astonishing how little shock or even indisposition Block's experimental animals showed, and how easily they recovered. Block himself never found it necessary to drain either thorax or wound; the operation lasted but two or three minutes, and as the ligature was used there was no intrathoracic hæmorrhage, while that from the wound was insignificant.

On the other hand Gluck and Schmidt have both made more or less extensive resection of ribs, the former removing half or the whole of one lung, the latter taking out wedge-shaped pieces from both lungs—and with success. Both these experimenters resorted to drainage.

<sup>1</sup> Berl. klin. Wochschft., 1881, No. 44, p. 645; Deutsch. med. Woch., 1881, No. 49.

<sup>2</sup> Gaz. méd. de Paris, 1881, I. 695.

<sup>3</sup> Berl. klin. Woch., 1881, Oct. 31; Deutsch. med. Woch., 1881, No. 47. Verhandlung, d. Deutsch. Gessellschaft. f. Chir., 1882, p. 77.

<sup>4</sup> Berl. klin. Woch., 1881, No. 51, p. 757.

<sup>5</sup> Giorn. internaz. d. Sc. med., 1882, p. 759., 1883, p. 248.



Virtually the same results were reported by Marcus. Biondi enjoyed a much larger experience with the procedure and thus summarized his results :—

						OPERATIONS.	SUCCESSES.
Extirpation of right lung.	-	-	-	-	-	23	12
“ left “	-	-	-	-	-	34	18
“ both apices	-	-	-	-	-	3	2
“ middle lobe	-	-	-	-	-	1	1
“ lower “	-	-	-	-	-	1	1

Since these experiments Biondi has been creating an artificial tuberculosis pulmonum and then extirpating the infected portion. He infected his animals either by injecting tuberculous sputum into a bronchus, or by incising the thorax, drawing out the lung and injecting some sputum directly into its substance. Nine out of twenty-one animals died of septic pleuritis as the result of these inoculations, and one of rapid tuberculosis. The others began—after sixteen to twenty days—to show signs of infection. In from twenty-five to thirty five days after inoculation the lung involved was resected.

Four of the eleven animals died quickly as a result of the operation. In two of these, as in the specimens removed later from five of the survivors, well marked tubercular deposits could be demonstrated in the excised portion. The seven animals which survived were watched for a long time and not the slightest sign of further tubercular trouble perceived.<sup>1</sup>

At the present time clinical reports of pneumectomies are, obviously, very few in number. The following are, so far as I know, all that are on record.

Krönlein<sup>2</sup> was probably the first to deliberately remove a portion of human lung, except for hernia of the same. His case was that of a girl of eighteen, who presented a recedive of sarcoma of the sixth rib. For its removal he was compelled to resect the whole thickness of the thoracic wall between the fifth and seventh ribs. The tumor had penetrated and contracted adhesions with the lung. These were easily

<sup>2</sup> Berl. klin. Woch. 1884. No. 9.

<sup>1</sup> Wiener med. Jahrbücher. 1884. Hft. 2-3.

separated with the finger without much hæmorrhage. Whereupon a sarcomatous nodule was discovered in the substance of the collapsed lung, which was then excised with scissors. The pulmonary wound was then closed with fine catgut, and the patient rapidly recovered, the traumatic pneumo-thorax rapidly vanishing.

Weinlechner<sup>1</sup> had to deal with a myxochondroma of the right chest wall which had attained the size of the patient's head. In the course of the operation it was found that the underlying ribs had undergone absorption and that the softened mass was connected with the lung. Accordingly the surrounding ribs were resected and the pleural cavity opened. In spite of the consequent dyspnœa the diseased portion of the lung was removed after previous ligature. Antiseptic dressings. Patient recovered from the effects of the operation to die later of septic pleuritis.

Omboni<sup>2</sup> has reported a most interesting case of a tuberculous patient who shot himself, the pistol bullet passing in just to the inner side of and below the left nipple. He diagnosed pneumo-hæmo-thorax and a large posterior extravasation, and on the following day, since the patient was almost in collapse from intra-thoracic hæmorrhage, anæsthetized him and proceeded as follows: An incision 13 ctm. long was made in the third intercostal space; upon opening the pleura a quantity of blood escaped. At the free lower border of the upper lobe appeared a wound; the surrounding tissue was seized with clamps, a catgut ligature thrown around the part, and after ligation it was excised. Also at the lower part of the lung was another wound, which was treated in the same way. Considerable difficulty was met with; twice a halt was called. Solution of sulpho-carbolate of zinc was used for irrigation. Death from sepsis followed in six days. No disturbance in the lung, but suppuration had occurred between the ribs and the serratus. The operator regretted that he had made anterior drainage, and wished that he had either made posterior drainage or none at all.

<sup>1</sup> Wiener med. Woch., 1882. No. 20.

<sup>2</sup> Annali univ. di med. e chir. 1885. Jan. Centrblt. f. chir. 1885, p. 672.

Ruggi<sup>1</sup> has made two pneumectomies. His first case was that of a woman of thirty, who had phthisical cavities in the right apex. She also had fungous arthritis of the knee. The second and third ribs were resected with their cartilages for 9 ctm. and the whole of the upper right lobe removed. Temperature and respiration became normal in six hours. She died on the ninth day of carbolic poisoning.

His second case was a man of thirty. After similar attempts it was found impossible to detach the lung from its pleuritic adhesions. Death supervened in thirty-six hours. In spite of his failures Ruggi holds that the operation will yet prove feasible.

Dr. Anthony Milton, of Georgia (according to Truc<sup>2</sup>), is said to have removed the fifth and sixth ribs, which were carious, and then to have taken away two-thirds of one of the lobes of the right lung. The patient lived four months. I can not learn the nature of the lesion that led to so severe an operation.

Block, whose experiments on animals have already been alluded to, believed so firmly in the infallibility of pneumectomy that he would fain practice it on man. Accordingly he operated on both apices of a young lady relative who was supposed to have apical lesions. She quickly succumbed, and her death led to a medico-legal inquiry, in the course of which it was claimed that her lungs were not affected. Chagrined and distressed he sought solace in suicide, his death quickly following hers.

A case of extreme interest and closely bearing on our subject deserves mention here, though not exactly one of pneumectomy.

König<sup>3</sup> had a case of osteochondroma of the sternum upon which he made a masterly operation. The sternum was sawed through at the level of the first rib and all of it below this line was removed, with three ctm. of the ribs on each side. After separating all the bony connections, while lifting the bone out

<sup>1</sup> La Tecnica della pneumectomia nell'uomo. Bologna, 1885.

<sup>2</sup> L. c. p. 31. *Petit: Rev. méd. et chir.* 1877, b. 791.

<sup>3</sup> *Centrblt. f. Chir.*, 1882, No. 42. p. 681.

of its mediastinal seat the right pleural sac was opened; this opening was tamponed. The pericardium was next exposed, and an infected point was excised—thus opening its sac. In the subsequent course of the operation both these openings were closed by suture. The operation lasted two hours and a half. The patient completely recovered.

Fischer, of Breslau, had also a similar case with equally happy termination.

*Indications.* For the present, at least, I should consider pneumectomy to be indicated for:—

Hæmorrhage, from a wound of the lung.

Hernia of the lung—traumatic.

Neoplasms, especially those of the pulmonary environment which involve the lungs.

Disease (tubercular) of one lobe?

Omboni's case given above, demonstrates the brilliant possibilities of pneumectomy for the relief of hæmorrhage.

P. Vogt<sup>1</sup> was decidedly of the opinion that it was the only thing to do in such cases.

A portion of lung, either gangrenous or healthy, has been repeatedly removed when protruding from the thorax. But with such cases I have not concerned myself in this paper and so do not propose now to consider them. I therefore simply mention the condition as an indication for the operation.

That even cancer of the lung is not always beyond operation has been made clear by cases quoted. Primary cancer is unlikely to be recognized in time to justify operation; secondary deposits will probably prove too diffuse; yet there is now no reason for shrinking from a tumor of the thoracic wall for fear that it may involve the underlying lung.

Thus far the results of pneumectomy for tubercular disease have certainly not been encouraging. The doubly sad termination of Block's case is likely to deter men for some time from repeating his essay. Nevertheless, advanced surgeons the world over regard tubercular disease at the outset as *usually* a local one, curable in proportion to its accessibility and

<sup>1</sup> Greifswald. chirurg. Klinik. 1884.

early attack. So while I would not say that we are just yet prepared for this sort of thing, I should neither be surprised at its attempt by some venturesome spirit nor condemn it; and I look forward to the time—perhaps just before the millenium—diagnosis and technique having in the meantime been perfected, when excision of the tuberculous apex may be the recognized treatment. Still I have placed a judicious and provisional question-mark after it in the above list of indications.

*Operation.* Concerning the operative attack I do not need to say much here. It is summed up in the following:—Thoracotomy, *i. e.* opening of the chest; this may be by simple incision over an intercostal space, or by section or subperiosteal resection of one or more ribs, according to circumstances. Block found that he could remove even infiltrated lobes by simple incision. Removal of so much of the lung as may be called for, probably in cuneiform piece; this preferably by ligature followed by the scissors. If desired the pulmonary wound may be closed by bringing together the pleural edges over it, just as the peritoneum is sewed over the stumps of certain abdominal tumors. Next comes the matter of drainage; under ordinary circumstances this interferes with expansion and adds to the risk of infection. In all probability it would not be necessary in uncomplicated cases. Block never saw inflammation set up in the stump or in the pleural cavity by leaving the slight amount of blood which escaped during or after the operation. He moreover held that if empyæma occur, it may be treated on well known principles. On the other hand Truc asserts that drainage is necessary, though it does not appear that he speaks from any personal experience. Beyond this the ordinary antiseptic dressings. Truc thus concludes his chapter devoted to pneumectomy:—“*Ces pensées hardies seront-elles réalisables? Espérons le.*”

#### THORACOPLASTY.

Under this heading I desire to call your attention to the

operation of Estlander<sup>1</sup> and its modifications, for those cases of empyæma which have either resisted all other methods of treatment, or which when seen are evidently only suitable for it. His first communication was published in 1879.<sup>2</sup> To briefly state the conditions upon which his operation is based I would remind you that in a chest full of pus the lung is more or less collapsed and that its expansion is impossible prior to removal of the pus. When this pus has been long present the pleura becomes enormously thickened and the lung loses its power to completely expand. If now this pus be evacuated, air must take the place of a part of it at least. When the pus is removed by incision, the air has free access, the lung can only expand so far, and the bony wall of the chest can not sink in to meet it part way because of the rigidity of those bony arches, the ribs. When adhesions are present that part thus bound to the chest wall cannot collapse, but the balance can and does. In either case we have to do virtually with a large or small cold abscess, whose inner wall, though somewhat flexible, can not "give" very much, and whose outer wall is absolutely immobile. This condition does not obtain in a recent empyæma; it is met with in cases of several months or years' standing.

In such cases almost any section of the ribs which shall break their rigid outline and permit them to bend or sink in, will meet the indication. As my colleague, Dr. Mynter, has recently pointed out,<sup>3</sup> Estlander removed in his first operation almost the whole of one rib, but later advised to remove smaller parts of several ribs, according to the size of their cavity, 3-6 ctm. of three to six ribs. His whole theory of work was to take from the bony arches their key-stone, thus allowing their sides to fall inward and together. It was later found that simply doing this was not always enough, so Schede, of Hamburg, recommended removal of some part of the bony chest wall. From the reports which I append of my own cases

<sup>1</sup>It is stated that this operation, now generally known as Estlander's, was conceived by Gayet and actually practised by Létévant. Simon and Heincke had also prepared the way for it, nevertheless the first to systematically treat these cases in this way and to recommend it as a definite procedure was Estlander, a surgeon of Helsingfors, who died a few years ago.

<sup>2</sup>Nordiskt Med. Ark. 1879. XI.

<sup>3</sup>Medical Press of Western New York, Nov., 1886, p. 626.



it will be seen that in the first of them I worked entirely on this principle (and before I had learned of Schede's modification); while in the second and third I did even much more, that is, I took away a large portion of the chest wall in front and another at the rear, with, in the second case, a remarkably rapid recovery.

Many of these cases with which we thus have to deal are complicated by pleural fistulæ, either spontaneous or the result of treatment by canula or by incision. Others are of long standing, where yet no outlet has been established. The former are really more favorable, largely because the lung will be found less compressed and more expansile. The suppurating or empyæmic cavity with an outlet tends to become smaller on account of thickening and cicatricial contraction of the pleura. That this contraction may be most persistent and forcible is amply proven by the scoliotic deformity which is so marked a feature of nearly every old case of this kind.

The thickening of the pleura, which at times amounts to half an inch or more, is no contraindication to the operation, but rather an important indication in its favor. By this time it has lost all its proper characteristics of a serous membrane. Of course I need scarce remind you of the danger of leaving these cases alone; amyloid degeneration, hectic, chronic septicæmia, general tuberculosis, exhaustion—these are a few of the untoward possibilities.

*Operation.* Of the operation itself I need scarcely speak here in minute detail. Subperiosteal resection of a rib or two is by itself an insignificant procedure; and while Estlander's operation can scarcely be termed insignificant, yet I have never known of a case where it by itself proved fatal. Patients fail to recover, or even die as my third case died (although this was vastly more than an ordinary Estlander operation), but not primarily from the operation so far as I know.

It is made in the Commune Hospital in Copenhagen, by its originator's compatriots, with a single incision, usually in or near the axillary line, perpendicular to the direction of the ribs; 4-6 ctm. of four to six ribs being removed through the incision.<sup>22</sup> This may be taken as a fair sample of its usual per-

tormance. The first operation in this country was made in 1882 by Fenger, of Chicago, a former personal friend and countryman of Estlander's.<sup>2</sup> By reason of their surroundings we usually try to avoid the first two and the last two ribs, although Schneider removed a part of the clavicle and the second rib with success. Some have recommended to unite by suture the soft parts over the line of section. It may be a good plan to unite the skin edges, but I have so far carefully refrained from uniting the pleural margins; indeed I have deliberately removed a longitudinal strip of this thickened lining for the purpose of securing greater collapse.

In many cases it is advisable to make a posterior drainage outlet. Concerning the artificial pneumo thorax produced in all these cases, as well as in those of pneumectomy, we need have no apprehension, since abundant experience has proved that of itself it has been rather a bugbear than a real element of danger. As showing how far this line of attack may be followed, Krönlein has recorded<sup>3</sup> a case of pyo-pneumothorax in which when he opened the pleural sac he saw a sloughy abscess cavity in the collapsed lung; this he washed out freely and drained with the best results.

I subjoin abstracts of the clinical histories of three recent cases of my own which on account of their intrinsic interest, may find a place with others similar.

CASE I. *Long Standing empyæma with fistulous opening; thoracoplastic costectomy. Recovery.* B. Kennedy, æt. 32, a patient of Dr. J. H. Pryor's at the Erie county almshouse. No accurate history to be elicited, save that in 1883 he had pleurisy on the left side, since which time he has been sick. For at least a year there has been a sinus a little below and to the outer side of the left nipple, from which pus has discharged freely. By the courtesy and with the assistance of Dr. Pryor I operated March 3, 1886. I first resected about three centimetres of the fifth rib for exploratory purposes. Finding the cavity a large but sharply circumscribed one, I made a free incision along the fifth rib, reflecting the soft parts for some distance on each

<sup>1</sup> Mynter, l. c. p. 628.

<sup>2</sup> Med. News, Sept. 23, 1882.

<sup>3</sup> Lancet (Am. Ed.), Sept., 1884, p. 225.

side. Through this I made a subperiosteal resection of 6 ctm. of the third rib, 10 ctm. of the fourth, 13 ctm. of the fifth, 14 ctm. of the sixth. By so doing I unroofed an abscess cavity some 17 ctm. in its longest diameter, its posterior margin being to the inside of the angles of the ribs, and some 12 ctm. in its greatest transverse diameter. The costal pleura was in some places fully 2 ctm. thick. This cavity I scraped thoroughly with the sharp spoon, and stuffed with iodoform gauze. Three deep silver sutures were used for approximation of the soft parts. No ligatures were required.

Improvement was rapid. He had been a confirmed invalid, spending most of his time in bed. He soon became an attendant in the ward; in two months was as strong as ever. The old abscess cavity was not quite cicatrized over for eight months. It healed with a depression in the side into which one might almost lay a fist, but recovery was positive.

CASE II. *Extensive Empyæma, of long standing. Operation. Recovery.* H. Chapman, æt. 20. Brought to me by Dr. John Miller, of Lancaster, Erie county. In December, 1882, patient had a pleurisy (left side) followed two weeks later by a relapse. In March following he had the third attack on that side. His empyæma was not recognized as such till June, when a physician made an incision and evacuated about three and a half quarts of pus. Since that time he has had constant discharge from the side. He had but recently come into Dr. Miller's hands. On examination I found the left chest wall much sunken in, the heart pushed way off to the right; two fistulous openings, one 5 ctm. above the left nipple, the other the same distance below, the former recent, the latter the original. Respiratory sounds almost absent over lower half of left chest. Already some tendency to lateral spinal curvature. General condition good.

August 19, 1886. Operation at the Buffalo General Hospital, in the presence of a number of medical men. A short piece of sixth rib resected first, for exploration. By this it was made plain that the left lung was almost entirely collapsed. I accordingly made subperiosteal resection of 5 ctm. of the fourth rib, 10 ctm. of the fifth and sixth, and 8 ctm. of the seventh and eighth, *in front*. Then making a long incision posteriorly near the inner margin of the scapula I removed 5 ctm. of the fifth, 8 ctm. of the sixth and seventh and 5 ctm. of the eighth. My hand could be easily passed to the upper margin of the pleural cavity so as to force upward the tissues above the clavicle; I had also opened down to the diaphragmatic level, the relations of the diaphragm being altered. So far as I could I scraped

out all the fungous lining of this large cavity, and touched it all up with a 50% solution of zinc chloride. A very few sutures were used—perhaps four.

The operation, which will be seen to have been more extensive even than Schede's modification contemplated, was followed by comparatively slight shock.

For a week or more, at each dressing, I was able to literally see through my patient; with the eye applied at one thoracic window I could recognize a face placed a foot from the other. Recovery was astonishingly rapid, in less than three months he was practically well, and within less than four months not a drop of pus could be found anywhere about him.

CASE III. *Pneumo-pyo-thorax; Thoracoplastic Resection. Death from Pneumonia.* Geo. Holker, æt. 20, Leon, Cattaraugus county, New York. A little over two years ago had pleurisy with effusion. Has never been well since then. Six months ago empyæma was recognized and he was then, and has since then twice been aspirated, a large amount of pus being removed at each sitting. Sent to me by Dr. Rood. Nov. 20th, 1886, pleural sac evidently refilled. I drew off with aspirator about eight fluid ounces of horribly offensive pus. He was constantly expectorating sputum having the same appearance and odor. His respiration was exceedingly embarrassed, but his pulse and temperature but slightly altered. Diagnosis was an empyæmic abscess connecting with some bronchus. After vigorous stimulant treatment I operated in my clinic at the General Hospital, Nov. 27th.

My procedure in this case was to make a long posterior incision through which I removed about 4 ctm. of the fourth, fifth, sixth, seventh, eighth, and ninth ribs. The pleura here was very thick. Evacuation of about a gallon of some very foetid pus. After its removal and the retraction of the thoracic walls a small opening was seen about the middle of the posterior surface of the lung through which air bubbled with each respiration. Patient was then turned over and an attack made anteriorly. Here I removed about 3 ctm. of the third, fourth, fifth and sixth ribs. On cutting through the thickened pleura I found to my surprise that to its under surface was adherent a portion of the lung. So tough and thick were the adhesions and so changed the lung tissue that I had cut into the lung, before I realized it, the incision being 8 ctm. long and 2 ctm. deep. Through this bloody froth came freely, and one or two vessels spurted vigorously. The latter I caught and ligated, the former I checked by sponges. By this time he was so weak that I gave up further effort to

get into the pleural cavity in front. The wound in the lung I dressed with styptic cotton. No sutures employed. Patient in extreme shock.

From this however he rallied, and was thenceforth free from his foetid expectoration. He did well till Nov. 30th when his sputum became pneumonic in character. Râles were heard in both lungs, and the breathing in the right became bronchial toward the last. Dec. 1st he died, as the autopsy showed, of pneumonia and exhaustion.

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For this I would refer to Truc's essay already quoted from. The following references are, however, not included in his list.

*Mosler.* Jour. Am. Med. Assn., March, 1884, p. 337.

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*DeCreuille.* Rev. méd. de la Suisse Romande, 1885. No. 8.

*Thomas.* British Med. Jour., Oct., 1885. p. 692.

*Bouilly.* Bull. et mém. de la Soc. de Chir. de Paris, 1886. XII. p. 646.

*Powell.* Diseases of the Lungs and Pleura, Chap. XIV.

# THE TREATMENT OF FRACTURED PATELLA.<sup>1</sup>

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THE lack of certainty in the results of treatment in cases of fracture of the patella, and the different values that are put by writers on the subject upon the various methods of securing the fulfilment of the general indications in the management of this injury, with a desire to learn what experience has taught the members of this society in the matter, are the reasons for submitting to the society this evening for discussion a short paper on the treatment of fracture of the patella, in order that the conclusions drawn from cases that have been under my care may be either confirmed or corrected.

That the discussion may be as practical as possible, and at the same time confined within reasonable limits, I submit the question: What is the best treatment in recent cases of simple transverse fracture of the patella? An answer to this question would doubtless be, in the main, the same by each of us, yet we should differ as to the relative importance of the obstacles to be overcome and the methods available for the purpose.

It is important to remember, in the first place, that the patella lies loosely in the tendon when the limb is lying in a horizontal position with the muscle relaxed, that the bone can be moved by passive motion freely and easily in a lateral and a downward direction, and not only so, but can be moved upward at will a distance of at least a third of an inch, showing that the ligamentum patellæ is not on the stretch normally; and so free is this motion of the bone that the leg can be

<sup>1</sup>Read before the New York Surgical Society, January 12, 1887.



flexed on the thigh to an angle of about  $130^{\circ}$  before the patella becomes fixed and immovable. And I have never been able to satisfy myself that this motion was any freer in my own limb with the body and thigh approximated, as they necessarily are in the sitting position, than in the limb of another person lying on a bed in a horizontal position, although theoretically it ought to be so.

The quadriceps muscle also has insertion into the capsular ligament, as well as into the tubercle of the tibia, through the ligamentum patellæ. A considerable part of the vasti muscles converges, it is true, to be inserted into the patella; but there is, after all, a certain part of the tendinous tissue directly continuous with the thin but strong capsular ligament. A very little dissection will demonstrate this to the eye; and the power to render the ligament tense is shown by traction on the vasti muscles in the dead subject, and a still better evidence of the force exerted by the vasti muscles in extension of the leg in the living subject is manifested by placing a finger on each side of the ligamentum patellæ and making the effort necessary in extending the leg, when the ligament will not only be found to become tense, but will perceptibly broaden under this effort.

This free motion of the patella is as marked, however, when the limb is horizontal as when it is elevated with the idea of approximating the origin and insertion of the muscle. It seems to me that these points are of value in deciding on what measures we shall use in diminishing the amount of separation that exists when the bone is fractured. The production of a few cases of fracture of the patella in the dead subject has thrown some light on the conditions essential for separation to take place in the fragments. I have been struck, in the first place, by the difficulty of producing a fracture of the bone by direct violence even with the leg flexed; and when the bone is sawn partly through from within outward, it is still difficult, by any force applied on its external surface, to complete the solution of continuity. When the partial section is made in the opposite direction, from without inward, a slighter force will complete it. When the bone is fractured alone,

without any injury to the ligamentous and aponeurotic tissues adjacent, the amount of separation of the fragments is practically nothing; the moderately thin handle of an ordinary scalpel in a post-mortem case can with difficulty be inserted flatwise between the fragments. This amount of separation, as we all know, can be increased by cutting the soft tissues at the side of the bone; but, even when the capsule is cut to the extent of three inches laterally on each side from the edge of the patella, the fragments could not be separated more than three inches and a half, and this required some pressure to be made on the lower fragment. Additional separation could be obtained only by further lateral cuts and by vertical incisions upward.

The few attempts that I have made to produce separation of the fragments of fractured patellæ by injections into the joint have been almost entirely failures, whether employing air or fluids, for, in order to allow of the separation taking place at all, the aponeurotic tissues of the joint must necessarily be cut more or less, and, although the nozzle of the syringe can be tied in securely, the air or fluid injected, with even slight pressure, finds its way into the areolar tissue outside of the joint cavity, and distends its meshes very rapidly. It seemed to me, however, that there was a slight separation produced by the fluid that remained in the joint; but of this I cannot be sure. Of course, where the bone is broken in the living subject, and inflammatory changes obliterate, in part at least, the areolar spaces in the immediate neighborhood of the lacerated capsule, and the fluid accumulates slowly, the problem is somewhat different, and, under these circumstances, the fluid might act in a way that it would be impossible for it to do in the dead body. I have an impression also, but nothing more, that, when the limb was elevated, the upper fragment sank a little downward by the weight of the water that remained in the upper part of the synovial sac. I should be unwilling, therefore, to draw any conclusions from my attempts to separate the fragments of broken patellæ by intra-articular injections.

I desire also, in connection with this subject, to describe the post-mortem appearances in two cases of fractured patella

in the Brooklyn Hospital, where death resulted from other causes, but within a few days of the production of the fracture. These appearances are, of course, familiar to all of us, but an ocular demonstration of them adds interest to the matter under discussion, and these are the only opportunities that I have had to examine such cases. I can save time and space by speaking of them together.

They were middle-aged men. The fracture was in the right patella; recent in each (within three or four days of death); one known to have been produced by muscular action, and the other probably so, for the patient was intoxicated at the time of injury, and knew nothing of the method of production, but there were no marks of bruising in the soft parts over the joint except a discoloration near the biceps tendon; the skin was somewhat less movable over the fractured than over the sound patella; there was a separation of the fragments of about an inch and a half; the circumference of the knee was an inch in the first, and an inch and a quarter in the second case, greater than in the other knee; the lower fragment sagged down to a very slight extent. The fracture was a little below the middle of the bone, and transverse, and the edges felt sharp and well defined. On cutting into the joint, a small subcutaneous clot was found in the first case, and a clot as large and as thick as the palm of the hand in the second case, over the biceps tendon. The areolar tissue over the fragments was stained with blood, and, to some extent, matted to the tendinous covering of the upper fragment; the joint had been directly opened into by a rather lacerated wound on each side of the patella, in each case about two inches or two inches and a half in length, and, in addition, in the second case there was a vertical rent, partly through the vastus externus and through the synovial membrane, about three inches in length; there was a moderate amount of bloody serum in each joint, and in the second case there were a few small clots; the upper fragment in the second case was more movable upward than in the first case. Much to my surprise, the fractured edges were not sharp and clean-cut, as I had supposed from my examination before the joint was opened, but the rent in the periosteum in front was at a lower level than in the bone itself, and quite irregularly lacerated, so that it dropped down like an apron in front of the free edge of the upper fragment, partially covering the broken surface. This was true of both cases, and in the first case there were a few particles of bone adherent to the lower side of this periosteal flap. The edges of the

fracture were covered and concealed by a firm clot that required considerable pressure with the thumb-nail to remove it, and this, with the periosteal flap already spoken of, was undoubtedly the explanation of my inability to obtain crepitus, although the fragments could be brought into contact with each other.

I take this peculiarity in the fracture to be unusual, not finding it described; but it is none the less singular that it should have been found in the only cases that I have had an opportunity to examine after death. To consider briefly the conditions that obtain in the living subject, we may start with the statement that the amount of separation of the fragments depends on the amount of laceration of the ligamentous and tendinous tissues in the neighborhood of the patella; not that in every case of extensive laceration there must necessarily be a wide gap, but that in every case of wide separation there must be extensive laceration as an essential condition. The presence of a considerable separation on superficial examination is proof of a considerable laceration, and we can satisfy ourselves of the presence or absence of laceration in cases where the fragments are close together by gentle flexion of the leg on the thigh, when the quadriceps will be excited to contract and tend to draw up the upper fragment, while the lower fragment will be displaced downward in cases where there is any laceration. If there is little or no separation under these circumstances, we may know that there is little or no laceration. I have occasionally, with the same object in view, made gentle pressure upward and downward on the fragments, but it has been accompanied by rather more pain than by flexion.

If we come now to consider the causes of separation of the fragments, while we admit that the clot interferes temporarily with the close approximation of the fragments, and the periosteal flap may in some cases prove a permanent obstacle to bony union, we must recognize that the real causes of separation are either muscular action or fluid accumulation in the joint; and it seems to me that facts do not warrant us in excluding either one of these causes. It does not seem to me that there is any natural tendency for the muscle to draw the upper fragment upward, inasmuch as the bone is so movable in its tendon; but when fracture takes place, the quadriceps is no exception to the contraction that takes place in all voluntary muscles after fracture, produced probably either by direct or reflex irritation—contraction that, unless overcome by proper methods, causes a very considerable amount of permanent shortening. There are also frequent contractions of the muscle taking place whenever the patients attempt to sit

up, or even to turn over or to raise the hips, etc. ; for, while the muscle is comparatively inactive after fracture, I do not think that it is paralyzed, for, with slight stimulus, the upper fragment is perceptibly drawn upward by it. Free from any tendency, therefore, to draw the unbroken bone upward, it seems to me, when fracture has taken place, that spasmodic action and the usual contraction that takes place after any fracture are causes at work in the production of the gap in fractured patella. And these two kinds of action take place quite as readily with an elevated as with a horizontal limb. It is true also that in the few cases of separation of the ligamentum patellæ that I have seen the bone has been drawn upward, producing a perceptible depression at the point of rupture, even though the joint was not injured and the amount of fluid in the synovial sac did not seem adequate to account for the displacement.

That the fluid in the joint, however, is a potent element in the production of separation, is to my mind quite clear. I saw it very forcibly illustrated in a case of fracture in the Brooklyn Hospital, while interne in that institution :

An officer, in helping to transfer an injured patient from a carriage to the hospital entrance, slipped and fell, producing a fracture of the patella. I saw him within five minutes of the receipt of the injury and found no separation. The fluid accumulated in the joint, and the separation increased as the fluid increased.

One would expect that if there were tension of the muscle normally present, the separation would have taken place immediately ; and it might be said that the usual behavior of muscles after fracture would account for the gap as well as the fluid in the joint ; but, as the fluid was absorbed, the gap diminished, as is not infrequent, and this I think could have been due only to the diminished pressure on the fragments by the fluid in the joint. Important, therefore, as the fluid in the sac is as a cause of separation of the fragments in fractured patella, it seems to me a less potent cause than the unusual action of the muscle. For what I saw in a case a few weeks since is generally true in cases that I have observed : that while the fluid had increased the circumference of the knee by two inches beyond the normal measurement, and aspiration had been suggested, by careful and slow traction of the fragments, crepitus could be obtained, although the fragments were quite two inches apart. It must be remembered that the normal capacity of the joint is increased by the rent in the soft tissues and the opening up, to some extent, of the areolar spaces in the neighborhood. Of course, it goes without saying that the inflammatory trouble in the

joint enters as a somewhat important element in the treatment of the fracture.

The indications for treatment are plain enough with regard to the coaptation of the fragments. The other indications usually mentioned are the treatment of the inflammation of the joint and its resulting effusion, and the prevention of ankylosis.

The first is by all means the most important, and the variety of devices used for the purpose shows, in the main, their inefficiency. It seems to me, in the first place, that elevation of the limb is unnecessary and undesirable, for the reasons already given. All those methods for approximating the fragments that make traction on the skin alone and indirectly only on the bone are very inefficient in bringing the edges of the fragments together. They have the advantage of early application, of not pressing downward or tilting the fragments and thus avoiding the formation of adhesions; but being attached only to the movable skin, they must fulfil very imperfectly this first indication.

Those appliances that are used where traction is made obliquely backward and downward and upward on the fragments, while more powerful and efficient than the former method, have some objections. They cannot be applied until the inflammatory trouble subsides and the fluid is in part at least absorbed, or, if applied earlier, they produce so much pain that the necessary force can not be used to approximate the fragments, and while pressing on the fragments they at the same time press on the fluid, and in both ways tilt the fragments up; and even when applied late, they press the fragments against the condyles of the femur and favor the development of adhesions. Nor have they a very good control over the upper fragment, for the least involuntary effort at contraction obliterates the depression above the patella and the bone slides up underneath the dressing, I think the objection made to them by Manning has force also, that the constriction of the dressing presses on the nutrient arteries and so interferes with repair. The most efficient way of approximating the fragments and keeping them in contact is by traction directly on the bone, and it seems to me that Malgaigne's hooks accomplish this end satisfactorily. They can be applied very easily; the traction is made directly on the bone fragments, and is in the long axis of the limb, thus avoiding both tilting and adhesions to the condyles of the femur, the fluid in the joint assisting in lifting the fragments up away from the condyles; the control of the motion—or the effects of motion—in the quadriceps is complete; the fluid does not interfere with the application; they therefore give the best chance for bony or very short ligamentous union.



The objections, it seems to me, are not all sufficient to deter us from using them, in view of the advantages they possess. I have used them in five cases with success getting as an immediate result a shorter bond of union than by any other method, though never union by bone thus far. The pain was not great, the location of the introduction of the points not being a specially sensitive part, and the wounds behaving kindly by constant care and cleanliness. The pain of introduction could be diminished by the use of cocaine subcutaneously. The danger of necrosis, of erysipelas, suppuration, etc., is undoubtedly to be taken into account, but must be of very rare occurrence. The objection that if their use is followed by bony union the patient is worse off than if he had a moderately short ligamentous union on account of the greater liability of refracture, it seems to me is not a fair one, for the cases of refracture or rupture under these circumstances seems to have occurred soon after the discharge of the patient, while the bond of union was still weak; and we have all seen the same thing take place in cases where the separation was half an inch or more in extent, the firmness of the ligamentous band being dependent rather on its age than its length: The objection that they are "infernal" and "barbarous" is not sufficiently exact to be answered.

The second indication—the treatment of inflammation and the fluid accumulation—has been fulfilled in my cases by the ordinary rest, evaporating lotions, etc., I never have found it necessary to aspirate the joint, and it must be very seldom necessary to resort to this measure, as the broken fragments can be very easily approximated with the joint quite distended with fluid; besides the operation is not entirely free from the dangers of suppuration in the knee joint. It seems to me unwise to resort to any active measures in fulfilling the third indication, the prevention of ankylosis, by flexion ever so gentle before the eighth week at the earliest; and to do this by the third week, as is recommended, is dangerous to the integrity of the ligamentous union if sufficient force is used to affect the adhesions at all.

I should expect, and have obtained, the best result in the treatment of simple transverse fracture of the patella by applying a posterior splint with the limb horizontal and lying in a natural position but not fully extended, by using Malgaigne's hooks introduced on the first or second day after the receipt of the fracture, by keeping this dressing on for four weeks, then removing the hooks, but not the splint, which has been kept on for four weeks more, the patient being in bed; then the patient allowed to be out of bed with the knee immovable for four weeks longer; by the use of the ordinary remedies for the relief of the

inflammatory joint symptoms in the early stage, but without resort to aspiration; and by avoiding any effort to disturb adhesions until after the end of the third month, and then only by the patient's ordinary use of the joint in walking, etc.

I have purposely omitted saying anything about unusual forms of fracture of the patella, because they are outside the scope of the present inquiry, and have also said nothing of the treatment of old cases with weak knee by wiring, because I have no personal experience to relate.

# A CASE OF DISLOCATION OF ACROMIAL END OF THE CLAVICLE DIRECTLY BACKWARDS.

By G. G. DAVIS, M. D., M. R. C. S., ENG.,

OF PHILADELPHIA.

ASSISTANT SURGEON TO THE EPISCOPAL AND ORTHOPÆDIC HOSPITAL.

A LABORER, æt. 40, while standing on a boat, was struck on the back of the left shoulder by a large iron bucket which was swinging from a crane. He was knocked down by the blow, and partly stunned. He came at once to the hospital complaining of pain in the shoulder, particularly on moving the arm.

On examining him, the posterior part of the shoulder was seen to be scratched and somewhat bruised, showing where he had been struck.

On examining him from the front, both clavicles projected above the acromion process an equal distance, thus showing that there was not, as I had at first suspected, a simple upward displacement. In front of the acromial extremity of the left side there was a marked hollow and the acromion process appeared more distinct and prominent than that of the sound side.

On following the line of the clavicle with the finger one could feel the inner edge of the acromion process projecting about an inch in front of the displaced end of the clavicle. •

On looking at him from the rear the displaced end of the clavicle was seen resting on the spine of the scapula, forming a marked projection near its outer extremity. It rested in the supra-spinous fossa. The movements of the arm were quite good, although somewhat restricted and painful.

Attempts were made to reduce the luxation, both while the patient was in a sitting and standing position, but difficulty being experienced, he was placed flat on his back and the bone was replaced without trouble. On rising from the recumbent position, the deformity immediately reappeared.

The following dressing was then applied, while the patient was still lying on his back with the deformity reduced. A roll of bandage an

inch and a half long and three-quarters of an inch in diameter was pressed into the supra-spinous fossa close to the extremity of clavicle being wedged in by the posterior surface of the clavicle in front, and the anterior surface of the spine of the scapula behind.

This was kept in place by two strips of adhesive plaster about eighteen inches long by two broad, crossing directly over it and fastened in front and back to the chest. A pad of lint was then laid over the shoulder and the third roller of Desault applied, the hand being placed in a sling.

The man was under treatment for three or four weeks, and recovered the full use of the arm and had not the slightest trace of deformity.

Dislocations of the acromial end of the clavicle (as they are called), although regarded by some as very rare are, in my experience at least, not very uncommon. I have certainly in a moderate experience seen three or four. They were, however, all upwards, and when I saw that this was not of that character I knew it was a rare form, and examined it carefully.

No one, by examining him in front, except from the prominence of the acromion process, would have suspected a dislocation of the clavicle. Viewed from this direction, there was absolutely no difference in the profile of the two shoulders. Viewing him, however, from the side and rear, the deformity was at once evident, and the diagnosis easily established by following the line of the clavicle and acromion and spine of the scapula with the fingers. In a dislocation of this joint I had expected to find some upward displacement, but I could see none, it appeared as though the scapula had just been displaced forwards about the length of its articulation with the clavicle, a distance of three-fourths of an inch or an inch.

That it was a distinct dislocation was shown by the marked deformity, the ease with which it was reduced with the man on his back and the certainty of its reappearance when he assumed an upright position. Malgaigne, in his treatise on luxations, divides them into incomplete and complete upward, sub-acromial and sub-coracoid luxations. Although he did not make a separate class, still he undoubtedly did recognize the existence of dislocations upwards and backwards, for he

says (p. 436): "It is rare that the clavicle is not carried either in front or back at the same time as up. I have seen it backwards four times, once among others at more than one centimetre behind the facet of the acromion."

The best description of this upward and backward dislocation is by Bevan, in the *Dublin Quart. Jour. Med. Sci.*, 1869, XLVIII, p. 492-496. He endeavors to show that his case differed from Malgaigne's four cases by assuming that Malgaigne regarded his cases as simple upward dislocations. That this was not the fact will, I think, be shown by the above quotation; indeed, one of the cases was a very marked one, Malgaigne giving the amount of posterior displacement as being one centimetre behind the facet of the acromion. Still, Malgaigne did not appreciate the importance of this particular form of dislocation, and Bevan did, and to him belongs the honor of recognizing it, carefully describing it and setting it properly before the profession.

Since Bevan's article there have been three cases published, two by Dr. Dawson (*Cin. Lan. and Observer*, 1870, XIII, p. 741), and one by Doughty (*Richmond and Louisville Med. Jour.*, July, 1876, Vol. XXII, p. 1-7, and reference is made to it by Hamilton, Ashhurst and Erichsen. The two former consider it more from the standpoint of treatment, and none of the latter do much more than mention its existence.

That there is an upward and backward dislocation, and that it does differ very essentially from a simple upward one will be evident to any one who reads Bevan's article.

To Malgaigne's division into incomplete and complete upward, sub-coracoid and sub-acromial luxations may be added the upward and backward dislocation of Bevan, and I believe also the simple backward luxation of which my own case is an example. Instead, however, of making two separate classes of these two backward dislocations, they can be included in a single one with two varieties, just as Malgaigne did with the upward one. If they were comparatively slight they were called incomplete, but if they were marked and the clavicle was entirely displaced, they were complete. In the same manner we can call a purely backward dislocation an incom-

plete backward one, and a dislocation upwards and backwards a complete dislocation backwards, because it is evident that with these two the same as with the first two, it is only a question of degree. Had the clavicle in my case been displaced farther backwards, the ligamentous connection with the scapula would have been destroyed and it would of necessity have been drawn up by the trapezius, the shoulder would have fallen and we would have had a marked displacement upwards as well as backwards. This occurred in Bevan's case.

The dislocations at this end of the clavicle are almost always produced by direct violence.

Bevan says that to produce the upward and backward dislocation the force must be applied to the clavicle itself and on its anterior aspect. This was how it occurred in his case, but regarding, as I do, the upward and backward as merely a complete and more advanced form of the backward dislocation, I cannot regard it as being the only manner by which it can be produced. In my own case the scapula was thrust forward by a blow from the rear, and had it been more violent or the resistance greater, we would undoubtedly have had a case produced exactly similar to that of Bevan's.

As regards the diagnosis, no difficulty, as a rule, will be found: the deformity is marked, the swelling slight, and the relative position of the displaced parts can be readily determined by the fingers. Concerning the treatment, the same is true here as in simple upward dislocations. When they are incomplete, it is often possible to retain the parts fairly well in position, and a good result both as regards function and deformity can be secured, but when it is complete the greatest difficulty will be encountered in keeping the deformity reduced, and healing takes place both with marked deformity and even more loss of function than occurs in complete upward luxations.

It will be found much easier to reduce the deformity while, the patient is lying on his back, and all retentive apparatus should be applied while he is in the recumbent position.

Doughty had a very good result by bringing the arm backwards and to the body, and fixing it in that position by adhe-



sive plaster, much as in Dr. Sayre's dressing for fractured clavicle.

Drs. Montgomery (*Am. Jour. Med. Sci.*, 1875, LXX, 407) Sherman and Price (*Trans. N. Y. State Med. Soc.*, 1875, 361-364), applied Dr. Moore's bandage for fractured clavicle (*Trans. N. Y. Med. Soc.*, 1870) to dislocations of the clavicle upwards with good results; and in view of Dr. Doughty's experience it would be wise to give either it or Dr. Sayre's dressing a trial in these complete backward dislocations. In my own case the only thing necessary was to keep the clavicle from slipping backwards towards the scapular spine, and this was accomplished by wedging in a small firm roll of bandage between the end of the clavicle and the spine of the scapula. This was retained in place by the two long strips of adhesive plaster and crossed over it and also by an additional soft lint pad held in place by a firmly applied third roller of Desault.

## THE STRING DRAIN—A SUPPLEMENT TO THE ORDINARY DRAINAGE TUBE.

By A. R. JENKINS, M.D.,

OF HENDERSON, KY.

THE method proposed is a simple adjunct to the drainage tube, and is, in so far as the writer is aware, novel. The liberty is taken of calling it "the *string drain*."

It consists in introducing one end of thirty or forty feet of rough string, highly hygroscopic, and completely aseptic, through the usual "Chassaignac drainage tube," so that, when the last is placed in the wound, the string may be drawn through, from time to time, as will be explained hereafter.

The string may be of cotton, linen or wool, that has been freed of fat and disinfected, for which, purpose, it is recommended that it be treated after the manner that v. Bergmann prepares his gauze—by immersing the absorptive string for one hour in the following: Sublimate 1, glycerine 50, alcohol 100, water 150, warmed, to be dried, and kept in hermetically sealed glass jars; it will then hold  $\frac{1}{3}\%$ , sublimate, and is very absorbent. The end of the string being passed into the tube, and the tube placed in the wound, and it closed, then the strings and aperture or apertures of tube are covered by the usual protective of "gutta-percha paper" or "Lister's oiled silk," to hinder evaporation or gluing of the string. The string is now tried to see that it draws freely, and is so placed that it lies along the line of least resistance, and closely applies to the body's surface; over the gutta-percha paper and string, the gauze and cotton, etc. are to be placed. The coil of the string may be kept in an antiseptic magazine, such as a glass bottle (suggested by my colleague, Dr. Arch. Dixon), which can be included in the bandage or left out, as desired; in the last case, when not being used, the bottle should be

tightly stoppered, and covered by an antiseptic bandage. The draw-end should be left out, and can be drawn upon from time to time as may be necessary until it comes free of secretion.

The soiled end of the string can then be cut away, and it and the bandage at its emergence disinfected with a saturated solution of iodoform in ether.

The other end should be protected most rigidly against infection, as mentioned above.

Or the string might be placed in a coil in the wound itself, in form of tampon, and passed out through a drainage tube.

This might apply in wounds such as would be left after the removal of tumors (as lipoma), or might thus be used with Martin's drainage tube in "Douglas' fossa."

The process advocated is recommended during the first forty-eight hours when the wound is pouring out a large quantity of serum, before granulation is established on the wound's walls, which follows especially operations in which "carbolic" or other irritants are extensively employed, and in this time the tube is most likely to be stopped by coagula.

Also, the secretion thus brought out would be a ready criterion for examination of the wound's progress.

Kehrer substitutes for "Cheyne's catgut bundle" a similar arrangement of wool, the hairs lying parallel, and secured in a drainage tube of glass. Mosetig v. Moorhof extols this method, having tried it in a case of ovariectomy.

Macewen inserts a bundle of horse-hair in a decalcified bone drain, the hair to be removed in forty-eight hours, the tube to remain 'in situ.'—Mosetig v. Moorhof, *Chir. Technik*, u. v. a.

These methods are mentioned, because they are the only ones in which the writer has been able to find a resemblance, to the one described above.

## DIGITAL AMPUTATIONS UNDER COCAINE.

By NELSON L. NORTH, JR., M.D.

OF BROOKLYN.

I WISH to call attention to a very simple method of employing cocaine in cases, where, from injury to the fingers, amputation is found to be a necessity.

The injuries which more particularly have come under my observation are such as have been caused by stamping machines or circular saws, and include a series of operations varying from the amputation of a part of the last phalanx to the greater part of an entire finger or thumb, as the case may have been.

*The Method.* On the entrance of the patient and the exposure of the injured member, the wound is thoroughly saturated with a 4% solution of the hydrochlorate of cocaine before any examination is made, and then, after waiting a few minutes for absorption to take place, one can examine and probe the wound with entire satisfaction, as the patient makes no resistance, because he suffers no pain.

The flaps may then be cut, following each considerable incision with a few drops of the cocaine solution, and also using it occasionally to wet the entire denuded part, ligatures may be applied, and the bone sawed as necessity may demand.

The wound is now ready to be closed and, after thoroughly irrigating it with antiseptic solution and providing for proper drainage, sutures are applied and the wound dressed according to the principles of antiseptic surgery.

The method is simply one of saturating the wound with the cocaine solution—the cocaine is not injected. Not that there is any objection to such a procedure, but simply because of the lack of necessity—anæsthesia being sufficient without the use of the hypodermatic needle.

The question has been asked, does the cocaine interfere with primary union? No; in the cases under observation no bad effects have resulted from this method, either on the constitution of the patient or the healing of the wound. I have also used cocaine somewhat extensively and in the same way with very happy results, in wounds of the scalp and face, and in allaying the pain of those very annoying "little things" in the way of injuries which go so far toward making minor surgery disagreeable both to the patient and surgeon, and yet are of themselves not dangerous to life.

# INDEX OF SURGICAL PROGRESS.

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## GENERAL SURGERY.

**I. Remarks on the Preparation of Antiseptic Bichloride Solutions.** By Prof. O. ANGERER (Munich). Solutions of bichloride in ordinary water suffer a partial decomposition after a time, some of the mercury precipitating in the form of superchloride. This is somewhat influenced by light, warmth and air. Fürbringer last year found that 80% of the bichloride was thus separated in water of Jena. At Munich it amounts to 50%. This depends on the hardness of the water. Fürbringer found that various acids by breaking up the carbonates prevented this precipitation. The apothecary, Schillinger, of Munich, found that by adding an equal weight of common salt to any quantity of sublimate such precipitation after solution could also be avoided. Finally, Emmerich, of Munich, has experimented with this combination in very weak solutions (1:50,000) and compared the degree of asepsis achieved, with that from equally dilute solutions of simple bichloride. He finds the disinfecting power of the salt bichloride mixture quite equal to that of the bichloride alone.

The mixture can be made into tablets, and is thus more readily soluble than sublimate alone—from the ready solubility of the salt.—*Centbl. f. Chirg.*, 1887, No. 7.

**II. On Wound-Healing Under the Moist Blood-Clot.** By Dr. M. SCHEDE (Hamburg). Early in the practice of antiseptic wound-treatment it was variously noted, *e. g.*, by Wesser, Volkmann, Watson Cheyne, etc., that blood left in aseptic wounds did not disintegrate nor putrefy, but underwent organization in part or whole. Volkmann utilized the principle to secure a covering for exposed bone. Somewhat analogous was Hamilton's method of sponge-grafting. Still, this knowledge was not used further, and blood was still considered the



worst enemy to wounds, and specially liable to induce inflammatory complications. Careful stoppage of bleeding, ample drainage and compress-dressings were the fruits of this view, and that these have accomplished much is certain. Still, it does not follow that further progress is impossible.

While agreeing with Neuber and Esmarch that it is desirable to free wounds from all foreign bodies, even drains, he pursues a different method. Neuber seeks to avoid all accumulation of blood and secretions by holding apposed wound surfaces in contact even where depression is necessary. S. avails himself of the organizing power of the moist blood-clot. He thus fills defects with a plastic material, rendering both drainage and compression unnecessary.

Experience with Phelps's methods of open division of shortened parts in club-foot first lead him to study this subject. Here the large clot which at first filled the wound is found, at the end of three to four weeks under an antiseptic dressing, to have left but a scar and some dry odorless blood on the dressing—no secretion having occurred. Consequently, Schede concluded to try the same plan in a variety of other wounds, notably those where a bony defect was to be filled. He sums up 241 such operations, including, *e. g.*, 40 joint resections, 18 excavations of tubercular foci in bone with free opening into relatively healthy joints, 30 total removals of small 'cheesy bones, 29 necrotomies, 20 Phelps's operations, 24 extirpations of tumors, sacks, etc. He follows in general a uniform procedure; constriction, careful antiseptics (bichloride 1:1,000), complete removal of all diseased tissue. Usually, the wound was sewed up, except one or more openings, 1 to 2 ctm. long—at the highest, not as otherwise at the lowest point of the wound—that any excess of blood may pass into the dressing. Where the conditions seem to demand a surer discharge a Neuber's buttonhole was added. The skin was brought together without regard to the apposition of the deeper wound-walls. In some cases, as in Phelps's operation, the wound was left open. No drainage, but an imperforate protective silk covering, which should extend several ctm. beyond the wound edges. This must fit the skin nicely, and serves the double purpose of insuring the filling of the wound, and

then preventing any sucking up into the dressing or drying up of the wound-clots. No other imperforate layer; gauzes, cotton, moss sacks, and as perfect rest to the part as possible. With these precautions the course of the wound is quite typical and uniform. The blood fills up all angles and pockets of the wound, coagulates, and without any further accretion is gradually replaced from the parietes of the wound by permanent tissue. Small cavities in bone heal without a fistula in twelve to fourteen days, larger ones in three to six weeks.

Following the principle of keeping the wound free from foreign matters, he does not suture bones—unless at times with catgut. He uses instead hard rubber splints (from a Hamburg-New York Rubber Company) in the dressings, which by dipping in boiling water can be fitted as desired. The constriction should be released for a time before bandaging, and any special bleeding vessels ligated; frequently there is no need of ligatures. The filling of the wound with blood is entirely left to parenchymatous bleeding. He does not change the dressing until he expects to find the wound healed—not even if in the first few days the thick dressing becomes soaked through, unless it increases and keeps moist. No reaction follows besides occasionally an aseptic fever for two or three days.

His results were notably good. He has not applied the method as yet to operations on the hip-joint, nor on the soft parts of the body, except in tenotomies and deep lacerations with retraction.

Complete antisepsis is naturally a necessity. Where this seems questionable he advises filling the cavity with antiseptic material as gauze or bismuth and waiting for granulations. These may then be partially scraped and the wound after filling with blood be put up as otherwise at the start.

Imperfect results may follow: (1). From incomplete filling of the wound with blood. This can be avoided by suitable care at the beginning. (2). From fungous breaking down of the cicatrix, probably, only where all the tubercular material was not removed. In severe general tuberculosis the coagula do not organize. (3). From any septic infection. Foreign substances, as sequestra remaining in the wound, naturally lead to the formation of fistula.

The use of antiseptic powders would not be permissible in this method, and carbolic acid would, perhaps, not be as satisfactory as bichloride.

A series of typical cases are given in brief to illustrate his method. —*Arch. f. klin. Chir.*, 1886, Bd. 34, Hft. ii.

WM. BROWNING (Brooklyn).

## GENITO-URINARY ORGANS.

**I. Indications and Contraindications to Rapid Lithotripsy.** By J. C. FELIX GUYON (Paris). This paper is in opposition to the paper of Koenig and the general tendency of the last Congress of German Surgeons (*vid. ANNALS OF SURGERY*, vol. iv. page 535) and advocates lithotripsy in preference to lithotomy in almost all cases. Its great fault according to German surgeons, is that it requires consummate skill on the part of the operator, and can not be performed by every one. But all varieties of lithotomy demand a skilful operator; lithotomy must necessarily be preceded by a minute vesical exploration, made by instruments of slight curve, which only a practiced hand is capable of managing. In reality, lithotripsy is only difficult in certain cases. In all others it is the duty of the surgeon to give the patient the benefit of this operation, so simple and so benign. Since the middle of 1878, M. Guyon has operated for stone six hundred and seventy-eight times, using lithotomy only thirty-one times. In twelve cases of prerectal section, he obtained seven cures and five deaths, a mortality of 41.6%. Nineteen hypogastric sections gave ten recoveries and nine deaths, a mortality of 48.2%. Perineal section then gave the best percentage, but three of these cures were in young subjects, which is the reason for its apparent superiority. Tuffier has shown that the mortality of all the cases of hypogastric section he was able to collect was but 27%; if only the cases where the calculi were small, not weighing more than 30 grammes, be taken, the mortality is only 15.35%.

Now Desnos has collected the cases of rapid lithotripsy and the mortality was but 6.11%. In the author's cases, there were but thirty-four deaths, a mortality of but 5.2%. These figures are in marked contrast with those furnished by lithotomy, even for small calculi. In the last

twenty deaths, the author had three subjects who were respectively 81, 83 and 86 years of age; all three died quickly and the last two unexpectedly without any accident directly attributable to the urinary organs; all had large calculi and the oldest had several. The operator has thought that the shock of the operation might have been the real cause of death, and wondered if in cases of this kind, it would not be better to operate without chloroform. He has, however, obtained eight successes in patients from eighty to eighty-five years of age; he would not, however, urge operation at this age which so well tolerates calculus; no one, he thinks, would consider the indications for lithotomy in persons so old. Lithotrity with a long sitting under chloroform or lithotrity with short sittings is then the operation for persons of advanced age.

If the size of the stone be considered, we see that the limit for lithotrity is 5 to  $5\frac{1}{2}$  or exceptionally 6 cm.; smaller stones may not be amenable to lithotrity when very hard, but on the other hand certain very soft phosphatic stones of more than 6 cm. may be crushed. Of his last twenty deaths, twelve were in connection with calculi of from  $4\frac{1}{2}$  to 6 cm. in diameter, large and multiple stones or small and numerous stones. One patient died of erysipelas and another with diabetes; but as the author has operated several times in diabetes with success, he considers the large size of the calculus the determining cause of death in this case. One patient, *æt.* 62, succumbed without urinary complications. Ten died with nephritis, with or without cystitis. Among the eight stones not exceeding 4 cm., the crushing of which determined death; four measured from 3 to 4 cm. The last two had multiple calculi. Among the patients of this last group, one had cystitis with painful contracture. The eight patients last cited died with nephritis, the symptoms of which in four cases appeared on the very day of the operation. In two patients, the influence of cold was very manifest; in two others, an awakening of nephritic colic caused the explosion of a rapidly fatal nephritis. In all the others, the symptoms of a previous nephritis were aggravated by the operation.

So it is when the calculi are numerous or voluminous, or when the

bladder is particularly painful, that the propriety of lithotrity is to be discussed. The discussion then would bear upon a particular point, and not upon a collection of facts. It would be superfluous to consider the cases where lithotomy is imposed by the excessive size of the calculus, its extreme hardness, the impossibility of seizing it or of penetrating into the bladder. It should be noted that the two latter occurrences are rarely to be met with. Stones situated in a very notable *bas-fond* may be easily seized if the bladder is not too much contracted. Hypertrophy of the prostate rarely opposes the penetration of the instruments, stricture of the urethra can be dilated or incised, and a calibre of 7 mm. is sufficient. So, large calculi, multiple calculi and contractile and painful bladder considerably augment the difficulties and dangers of lithotrity; but are these cases, without which the statistics of lithotrity would be almost faultless, favorable to lithotomy?

Tuffier has shown that hypogastric section, when performed for moderate and small calculi, still gives a mortality of 15%. The statistics of Koenig's own operations present a mortality of 22% for perineal, and 80% for hypogastric section, although these include a number of particularly favorable cases, several children among others. Guyon operated upon 23 cases by lithotrity where the stones were from 5 to 6 cm. Three died (13.04%), and 20 recovered simply and rapidly. It is not necessary then to reject lithotrity for calculi of 5 to 6 cm., but it must not be performed unless the operator is sure he can easily execute the manœuvre, and finish in one sitting. Of the three patients who died, one had very painful bladder, another had a very large prostate, and the third became chilled.

He would especially look for contraindications on the part of the bladder; the question of inertia of the vesical muscle is of no importance to-day, for its participation in evacuation is not needed; nor need we be concerned about retention of urine, but antisepsis must be scrupulously observed, as much in lithotrity as in lithotomy; although the traumatism is less, the renal state is no more aggravated by one operation than by the other. Cystitis is not a contraindication to crushing. In three-fourths of the cases it disappears rapidly after the

operation. It is but rarely aggravated, and produced after the operation in exceptional cases. Lithotrity is simple, sure and benign in all cases where calculi are small or of moderate size. where the urethra is easy to penetrate and where the bladder is not contracted. Recurrence is not frequent. 4.3% in Guyon's cases, and, indeed, it is far from being exceptional after lithotomy. He has seen two cases after suprapubic cystotomy. He concludes that lithotrity should remain the operation of choice in the treatment of vesical calculi.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**II. The Limits of Lithotrity in the Treatment of Vesical Calculi.** By PIERRE BAZY (Paris). It may be assumed that death after lithotrity, aside from operative defects, is always due to an ascending nephritis, and the point of departure of this nephritis is cystitis. Bigelow has demonstrated that the real cause of cystitis in this case is the presence of irregular foreign bodies. But now that litholapaxy permits the complete removal of fragments in one sitting, crushing no more exposes the patient to cystitis and consequent nephritis than lithotomy. The indispensable condition is that the lithotrity be total and the evacuation complete. The stone then should not be too large nor too hard. No rule can be established with regard to this matter. A stone which is too large for one surgeon is not too large for another, and a stone which is too large for a surgeon at the beginning of his career will not be too large when he has acquired more experience. The condition of the bladder is important; for it is certain that a healthy bladder reacts less. But operative skill plays an important role, and the tolerance of the bladder varies with the surgeon. M. Bazy has crushed one stone weighing 100 grammes and 6 cm. in length. The operation, including the administration of chloroform, lasted an hour and a quarter. The patient rose on the 4th and returned home on the 7th day. He concludes:

1. Lithotrity is the method of choice in the treatment of vesical calculi; lithotomy is the method of necessity.

2. The contraindications to lithotrity are derived not, as has been said, from the condition of the kidneys, but rather from the condition of the bladder and the volume and hardness of the calculus



3. Asepsis of the urinary passages may be assured as well in lithotripsy as in lithotomy, and traumatism is reduced to the minimum by lithotripsy.

4. For lithotripsy, in doubtful cases, to preserve its superiority, it is necessary generally, if not invariably for the stone to be evacuated in one sitting.

5. When the bladder has been affected with inflammation for a long time, and it is necessary to assure a rapid evacuation of the products of secretion, the stone being also large, lithotomy may be preferable to lithotripsy.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**III. Indications and Contraindications to Lithotripsy.** By M. RELIQUET (Paris). With the apparatus which he devised in 1872, the author has been able without chloroform, in a single sitting, to crush calculi of 2 to 3 cm. into fragments small enough to be evacuated by the catheter. He considers Bigelow's instrument too large, but he has modified his own by enlarging the female blade and rendering the other sharper. Its peculiar curve permits it to be placed in the bas-fond and to avoid false seizure. Thirty minutes has always been sufficient for him to complete the operation, including the evacuation. Moreover, when the bladder contracts well, the evacuation is easily made without aspiration.

The contraindications are the general state, the stone itself and the condition of the urinary passages. The operation greatly depresses the subject, whence it is important that the subject be not too much debilitated.

Minute inquiry should always be made into the state of the kidneys and the operation delayed as long as there is not a normal quantity of urine and urea. The nature of the stone may be a contraindication. Mulberry calculi are unconquerable, but these very hard stones are excessively rare in France. He has observed but two cases, patients coming one from the Orient and the other from Algiers. Induration of the urethra and very large prostate may be obstacles to the passage of the lithotrite, but these cases are very rare, the author having observed but three.

On the part of the bladder, the contraindications may arise from the too great depth of the bas-fond, the immobilization of a stone in a sac either upon the lateral wall or behind the prostate. When the stone cannot be moved, lithotripsy must be rejected.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**IV. Suprapubic Cystotomy.** By FRÉDÉRIC GROSS (Nancy). From clinical and anatomical studies, the author concludes: (1). Suprapubic cystotomy has been frequently performed in young subjects and children; 307 cases give a mortality of 21%. (2). Two conditions facilitate the execution of the operation, the abdominal position of the bladder and the high position of the peritoneal cul-de-sac. (3). The conditions of vesical suture are more favorable in the young than in adults and the old. Primary union should be the rule in cases where the bladder and the urine are little or not at all altered, as in case of foreign bodies lately introduced or calculi of relatively recent formation. (4). Silk should always be used for vesical suture. Cat-gut gives no security. It would always be prudent to leave the abdominal wound open or to suture it, but partially with the addition of drainage. (5). The retained catheter should be rejected from the after-treatment. Catheterization repeated at definite intervals is preferable. (5). Vesical suture has its indications and contraindications which the surgeon must establish before each individual case.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**V. The Diagnosis and Treatment of Tumors of the Bladder.** By J. C. FELIX GUYON (Paris). In the immense majority of cases, the diagnosis of tumors of the urinary bladder can be established without operation. The cardinal symptom of vesical neoplasm is hæmaturia; when this occurs without appreciable cause, tumor should be suspected, still more so if it be produced in spite of repose; it becomes pathognomonic if its duration increases. Its abundance is of value but much less. The facility with which it is determined is also of great importance; when a simple catheterization determines an abundant and lasting hæmaturia, a tumor may be almost positively diagnosed; the hæmaturia may be determined either by the contact of

the sound or the contraction of the bladder ; in every case, the passage of blood is of importance, for it demonstrates that the bladder is the seat of the affection.

Ordinarily, it is easy to recognize hæmaturia of renal origin. When the kidney suffers from an affection capable of determining hæmaturia, it is generally augmented in volume ; this increase in volume may be recognized by palpation ; it may also be recognized by a new method of exploration which consists in looking for renal ballottement. If the kidney increases in volume and weight without being fixed by peripheral inflammation, it becomes movable ; it can then be thrown forward from behind. To do this one hand should be applied to the abdominal wall and the other behind in the ilio-costal space ; on rapidly depressing this latter point, the kidney is thrown forward and the anterior hand perceives a very clear sensation of ballottement.

The appearance of varicocele is a symptomatic sign. Finally renal hæmaturia is often preceded by nephritic colic, and is often accompanied by the expulsion of cylindrical cysts, veritable moulds of the calices or the pelvis.

Rectal digital examination permits two things to be appreciated, the thickness of the vesical wall, and, when joined with exploration of the abdomen, the volume of the bladder. Exploratory catheterization is of but moderate importance ; it cannot demonstrate the presence of a tumor, even of moderate size. Its negations are not of much value, because tumors are often too soft to give rise to a special sensation ; its affirmations are not of more value, because irregular contractions of the bladder may produce prominences, easily confounded with tumors ; however, catheterization may permit a tumor to be circumscribed and its extent recognized. Finally, fragments of the tumor are sometimes expelled with the urine ; this sign is of great value no doubt, but histological examination of these bits cannot give a certainty of the exact nature of the tumor, because vesical neoplasms are frequently not identical throughout their entire extent. The diagnosis of vesical neoplasm then is possible ; the study of the hæmaturia permits it to be made with certainty.

The presence of the tumor being known, its nature, its seat its ex-

tent and whether it is unique, are to be settled. There is but one exploratory operation which permits ocular inspection—suprapubic section, which is consequently the only useful one; but is it desirable to attempt operation to obtain these indications? As the only local contraindication to operation is too great infiltration of the walls, and as this infiltration can be recognized by rectal examination, it seems rational to dispense with a simple exploratory operation, because that which justifies exploratory incision justifies ablation.

With regard to early operation, it is demonstrated to-day on one hand, that if the tumor is malignant, it will always recur, whatever be the period of operation; on the other hand, there are numerous examples of complete cure of benign tumors even when the operation has been delayed.

Vesical tumors, malignant as well as benign, may occupy the bladder without the subject suffering otherwise than from hæmaturia. But there are cases where complications are added, cystitis, retention of urine, and from this standpoint, benign tumors are in exactly the same condition as the malignant; it is not the nature of the tumor but the trouble determined in the urinary functions that is of importance. Is it of interest to know early if the tumor is benign? Malignant tumors have hardly attained the size of a pea before they are accompanied by a marked infiltration of the wall, and when hæmaturia affirms their existence, it is already too late. On the other hand, benign tumors remain confined to the bladder, are never propagated and do not infiltrate the wall. Then benign tumors are always and malignant never removable. Not the volume of the tumor, but the appearance of complications, cystitis, retention, etc., should determine more or less early intervention. When they appear, the functions of the urinary apparatus are menaced. The operation must be radical, and for that the interior of the bladder must be open to easy examination; the frequency of accessory tumors alone would be sufficient to eliminate perineal section, and hypogastric section should be the resort. Resection of the vesical wall, not abrasion, is desirable. If the tumor lies in the superior segment of the bladder, it is possible and should be done; but the more often, the tumor lies at the level of the bas-fond

in the vicinity of the ureters, and resection is impossible. Then the surgeon should be content with abrasion and cauterization with red heat.

The author has performed eighteen operations upon fifteen patients, three being recurrences. In thirteen cases, the tumors were malignant, and there were but two in which permanent cure seemed to have been obtained; but in all cases the conditions which determined the operation were alleviated.—*French Congress of Surgery, Revue de chirurgie*, November, 1886.

**VIII. Primary Tuberculosis of the Scrotum.** By M. RECLUS (Paris). This affection has a place in no work on pathology. However, it is not unusual and its history presents some interest; its ordinary consequence is hernia of the testicle; the author wishes to demonstrate that the "fongus bénin" of Jarjavay is but the consequence of tuberculosis of the scrotum. Deville demonstrated that the fungus was the more often the result of tuberculosis, but he localized the tuberculosis in the epididymis, which was an error, as the following two cases show: 1. An intemperate subject of tuberculosis presented a purulent collection in the anterior part of the scrotum; this was incised and a tumor protruded, which was extirpated and proved to be the testicle. The tunica albuginea presented a large number of tubercles; the testicle was healthy, but at the periphery some gray granules were found, which appeared more recent than those of the albuginea; the epididymis was also healthy except a focus of growing tubercles which was not in connection with the scrotum. In the scrotum were two puriform foci, at the level of which the skin was thinned and on the point of perforating; it was evident that the loss of substance which allowed the issue of the testicle was but the result of a focus of this kind. 2. A tuberculous painter, with a history almost identical had three purulent collections which opened separately, and then the three openings joined, forming an opening through which a tumor passed. The patient died of pulmonary tuberculosis. The testicle was found to be healthy, but very slightly sclerosed; the epididymis was also healthy except a little tuberculous nucleus in the head. The

classical theory of fungus cannot be applied to these cases and must be abandoned ; it must be admitted that there was a primary tuberculosis of the scrotum, that the foci softened and opened externally and that this opening gave passage to the testicle. This is the rule, for the caseous nuclei of the epididymis are surrounded by fibrous tissue and there is a periepididymitis which encapsules a focus developed there ; in every case, in this tuberculosis of the epididymis, if fistulæ form, they are always behind ; in fungus, on the contrary, the seat of the tumor is in front. Examination of the thirty-three cases of Deville, together with those here presented, shows that tuberculosis of the scrotum is a unilateral affection, unlike that of the epididymis which is bilateral. It may be recalled that Syme has proposed in hernia of the testicle of tuberculous origin, to open the orifice and return the tumor ; this method has met with success, which could not have occurred if the testicles were filled with tubercles. The conclusion based upon these clinical and anatomical facts is that the "fongus bénin" of the testicle is due to the breaking down into pus of a tuberculous gumma of the scrotum.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**VII. Treatment of Hydrocele.** By M. TEDENAT (Montpelier). The author has followed one hundred and fifty patients, whom he has treated by iodine injection, for from six months to five years or more ; there were eight recurrences in the first four months, and in all 12%. But if, instead of the more attenuated solutions, pure tincture of iodine is introduced, the percentage of recurrence is reduced to 2% or 3%. According to the partisans of incision of the scrotum and excision of the tunica vaginalis, recurrence should never occur ; but as a matter of fact, it does, sometimes at least. Bergmann excises the entire tunica vaginalis. The author has performed this operation fifteen times, and all the cases were cured.

While he does not know of a death from iodine injections, an accident which is not rare consists in losing a drop of the fluid in the scrotum, giving rise to phlegmon ; besides infiltration of iodine into the scrotum there may be suppurating perivaginitis : however these



accidents are of little gravity. Incision doubtless ought to obviate these accidents if it is aseptic, but asepsis is particularly difficult to insure in this region. The true danger of iodine injection is hæmorrhagic perivaginitis; accordingly, he believes that excision should be performed in case of ancient hydrocele with thick and but slightly transparent walls; in ordinary hydrocele, translucent, with thin walls and without calcification, the treatment of election is iodine injection; a small quantity of tincture of iodine should be injected and allowed to remain in the tunica vaginalis.—*French Congress of Surgery, Revue de Chirurgie*. Nov., 1886.

JAMES E. PILCHER (U. S. Army).

**X. Rupture of Bladder—Laparotomy—Suture—Death from Suppression of Urine.** Mr. DUNCAN (Edinburgh). The wheel of a cart, which, with its contents, weighed about 25 cwts, passed over the lower part of a man's abdomen, about an hour after micturition. At 10 p. m., five hours afterwards, he was admitted to the Royal Infirmary, Edinburgh, with spasmodic abdominal pain, aggravated by movement, having an intense desire to micturate, but being unable to do so. No fracture of pelvis or injury to spine could be detected, only bruising and abrasion of front of thighs at upper part; on account of an extremely tight stricture and false passages. No instrument could be passed, but after a morphia suppository the patient passed some blood-stained urine with great difficulty, while in a hot bath. He slept well, but awoke up with symptoms unrelieved. At 2:30 p. m. Mr. Duncan saw the case, and having failed to pass an instrument and to draw off any urine by aspiration, he opened into the bladder by perineal section. Although no rupture could be felt with the finger, its presence was recognized by the only partial return of fluid injected by the perineal wound. Laparotomy was therefore performed, and a quantity of blood-stained fluid escaped from the peritoneal cavity. A rupture two and a half inches long was found on the upper and posterior part of the bladder. After washing out the abdominal cavity with hot water, a glass drainage tube was passed into Douglas' pouch, and the rest of the abdominal wound closed by cat-gut sutures. A drainage tube also was passed into the bladder by the

perineal wound. At first the patient did well, but on the evening of the next day, *i. e.*, the second day after the accident, suppression of urine set in, and by midnight was complete. In spite of all treatment it continued, and death supervened on the evening of the fourth day after the accident, and third after the operation. At the post-mortem examination the rupture of the bladder was found to be only half the length on the mucous that it was on the peritoneal coat. Kidneys showed signs of interstitial change with fatty degeneration of epithelium. Fatty liver. Very little peritonitis. No other condition of importance.—*Lancet*, Aug. 28, 1886.

C. W. CATHCART (Edinburg).

**XI. Operative Treatment of Hypertrophied Prostate.**  
By Dr. A. LANDERER (Leipsic). Gives a case of a man, *æt.* 63, who had had trouble in micturition for several years, and for one year hæmorrhages from the bladder, latterly pain the predominating symptom.

Exploration revealed an enlarged prostate, and in repeated introductions of sounds a rough body was once felt. Diagnosis of stone or incrustated tumor was made. Operation after Thompson, as if for tumor, was made, and after introduction of index finger into the bladder a stone was easily felt. At the moment, however, that attempts were made to secure the stone with forceps, narcosis became incomplete, and when the forceps were withdrawn after the spasms had ceased, the stone had eluded the instrument; but between the blades was found a portion of the middle lobe of the prostate. The stone being subsequently removed, the rest of the middle lobe of the prostate was trimmed off, iodoform applied, a drain fixed in the perineal wound, and irrigations of the bladder performed twice a day.

The wound healed in two weeks, the drainage tube having been removed after eight days. At the time of reporting, fifteen months after operation, the patient was in excellent health, and all trouble arising from the previous condition of the prostate had entirely vanished.

At first the author was vexed with the unintentional interference with the prostate, but when he observed what good effects followed, he was led to believe that surgical interference of this kind was the proper

treatment for hypertrophied prostate—at least in all such cases where the enlarged middle lobe causes the trouble, as in the majority of cases.

Extirpation of the entire gland he believes to be unjustifiable; the prostatic capsule should not even be opened on account of the venous plexus of the prostate, injury to which is apt to cause serious complications.

To facilitate the operation the author has constructed a special pair of forceps, somewhat resembling strong polypus-forceps with a sharpened edge. There is only a slight hemorrhage. The drainage of the bladder acts beneficially upon the cystitis generally present in these cases.

Comparison with other methods, such as injections of ergot, electrolysis, and galvano-cautery after Bottini are made in favor of the author's method.

Special attention is given to the bodily condition and habitus of the class of patients generally suffering from hypertrophied prostate.—*Deutsch. Zeitschr. f. Chir.*, Bd. 25, Hft. 1 and 2, December, 1886.

W. W. VAN ARSDALE (New York).

#### ABSCESSSES, TUMORS.

I. Inflammation of the Cavum Retzii or Prevesical Space. By Dr. O. PINNER (Frankfort on the Main). The writer publishes a case illustrating the condition in question, gives a detailed anatomical description of the parts referred to, with an account of his own dissections, and finally adds some general remarks suggested by his case and by one quoted from Gruber.

A man, æt. 45, who had suffered from muscular rheumatism, suddenly fell sick with pains in the lower region of the abdomen, which increased in intensity during the following days. Palpation could not be endured. No fever. Urine normal. After thirteen days infiltration of the region above the symphysis appeared, with elevations of temperature to 38.6° C. Fluctuation appeared. Aspiration revealed pus. The abscess subsequently reached considerable dimensions, measuring 27 cm. across. Incision vented fetid pus, and laid bare the

margin of the rectus muscle. The abscess cavity led underneath the rectus to the symphysis and under the rectus of the other side. Burrowing had also occurred in the cellular tissue beneath the skin towards the scrotum. Irrigation and drainage. In the course of recovery two further abscesses appeared situated in the deltoid muscles and between the tibia and fibula respectively. The cicatrix from the abdominal incision was finally only a few centimetres removed from the symphysis. Total time of illness five months. After comparing the anatomical descriptions of the tissue-spaces situated in front of the bladder given by different authors, the writer details his own methods of investigation. In order to study the prevesical space, he made an incision in the middle line above the symphysis, inserted a drainage tube, and injected soft plaster-of-Paris under considerable pressure.

The submuscular space proved difficult of demonstration, owing to the readiness with which the injected matter found its way into the prevesical space. It could, however, be accomplished by inserting the canula through the rectus into the space in question at a point situated above the semi-circular lines of Douglas.

The author is of opinion that these two distinct spaces should not be confounded, but differentiated clinically as well as anatomically.

The muscular space is bounded anteriorly by the posterior aspect of the rectus muscles, centrally by the linea alba, laterally by the external margin of the sheath of the rectus, below by the symphysis, and posteriorly by the transverse fascia of Cooper. The two submuscular spaces are but incompletely separated from each other by the connective tissue representing the linea alba, and therefore inter-communicate.

The prevesical space is bounded anteriorly by the os pubis and its branches, above by the transverse fascia, posteriorly by the fascia propria and the bladder, below by the pelvic fascia. The designation *Cavum Retzii* should be used only for the prevesical space.

In pathological conditions these two spaces are even more readily distinguished, in consequence of the thickening of the dividing tissues.

Phlegmons of the prevesical space are more frequently due to the

extension of inflammatory processes of the bladder, the rectum, the prostate, the broad ligaments, the iliac fossa, or the pubic bone. Phlegmons of the submuscular space, on the other hand, are more frequently due to other causes, such as traumatisms; or they may occur after fevers and diseases attacking the entire system; in which case there is some lesion of the muscles; or they may occur spontaneously without a known cause.

Phlegmons of both spaces present only general symptoms in the first stages; later on the symptoms of tumor in the hypogastric region appear. The symptoms belonging to both affections in the first stages are pain in the lower portion of the abdomen, pain on motion, great sensitiveness to pressure on the abdomen, so that a flexed posture of the knees and hips is sustained and no covering can be borne.

Local swelling may be apparent after a few days or not till after some weeks, and in some very acute cases the disease may set in with rigors and high fever.

The shape, extent and form of the disease varies, however, in the two affections.

Inflammation of the submuscular space is characterized by the shape of the tumor resembling the sheath of the rectus; and may be bilateral from the start or attack both sides consecutively. The apex of the tumor points to the symphysis: it is attached to the muscle and may be moved laterally with the integument. The space between the bladder and the symphysis is free, at least at first.

Tumor of the prevesical space, on the other hand, resembles the well-filled bladder. The apex points upwards. Palpation proves the tumor to originate from the pelvis. The recti can be brought into prominence above the tumor. Rectal examination enables the tumor to be felt. Bladder symptoms may also be present. Either affection may end in resorption or suppuration.

If incision is not made, the submuscular abscess generally perforates through the skin; or it may perforate into the abdomen. After recovery a hard mass may long be felt in connection with the rectus.

The prevesical abscess may perforate through the skin, into the abdominal cavity, or into the rectum, the bladder, the vagina, the ure-

thra, or through the incisura ischiadica, into the scrotum, or along the thigh.

Differential diagnosis from peritonitis, neuralgia, intestinal catarrh, must be made in the first stages. Later on affections of the bladder, tumors, intraperitoneal localized exudations, may come in question.

Exploration with the aspirating needle is recommended, and early incision to prevent perforation into the abdomen. Drainage may be assisted by a prone position—*Deutsch. Zeitschr. f. Chir.*, Vol. 23, Hft. 5 and 6, June, 1886.

W. W. VAN ARSDALE (New York).

## BONES, JOINTS, ORTHOPÆDIC.

**I. Fracture of Thigh, Reabsorption of Callus on the Seventieth Day during an Attack of Erysipelas.** Dr. FERRET (Paris). A youth, æt. 17, with a good previous history sustained a fracture of the middle third of the thigh during the first week of February. Put up and extended with Tillaux's apparatus it got well without any shortening. When on April 6 consolidation was perfect and the patient was getting about, an attack of erysipelas came on, starting from a spot chafed by the diachylon plaster. It was very severe, and on the sixth day the limb was found bent almost to an angle of forty degrees at the seat of fracture. The callus had all disappeared and there was complete mobility in every direction. The erysipelas was well on April 18, but there was deep pain in the situation of the fracture and to this was added, on the 22nd, both swelling and fluctuation. One hundred grammes of pus were let out by the aspirator. As a fresh accumulation took place, a large opening was made into an abscess cavity where the two ends of bone were found close together, the upper one completely denuded to the extent of 4 cm. Resection was performed, iodoform applied and the limb placed again in the apparatus. At the end of May the wound was healed, and the consolidation was once more perfect.

This sort of case is very rare. The more frequent ones are those in which the callus slowly softens and disappears on account of a generally bad state of health. Out of three cases which Dr. Ferret has



found reported, where it disappeared during an acute febrile disease, one only was properly examined, that of Schillings (*Med. Zeitung*). Here was also a fractured thigh in which, during the sixth week of typhoid fever, all the callus disappeared so entirely that no trace of it was afterward to be found at the post-mortem examination.

Dr. Ferret believes that when, during the course of typhoid or of an eruptive fever the callus thus disappears, the bone must be attacked by an inflammation of an infectious nature (*osteite infectieuse*) which sometimes accompanies those illnesses, and for which the recently formed callus presents a suitable soil—*Le Progres Medical*. Nov., 1886.

L. S. MARK (London).

**II. Isolated Dislocation Outwards of the Capitulum Radii.** By Dr. W. WAGNER (Königshütte). The first case was that of a miner who, while pushing a car, was struck in the elbow by a second car behind him. He had been dismissed in six weeks with a slightly movable joint. At the end of a year this had become so stiff that he sought relief. The elbow stood at a right angle with practically no mobility of any kind. There was an immovable bony prominence outside the external condyle, evidently the radial head. Other joints free. The capitulum, encased in fibrous masses, was excised. A wedge-shaped piece from its inner side, representing about one-sixth of its diameter, was firmly adherent to the joint capsule. This was also removed. By means of massage and baths mobility very slowly returned, flexion to  $80^{\circ}$ , extension to  $150^{\circ}$ , pronation quite and supination nearly to the norm.

A second, fresh case occurred in like manner. On admission the arm was held flexed by the other hand. Passive motion possible but painful. In narcosis the radial head was formed outside the external humeral condyle, remaining so on both flexion and extension. Careful palpation of the border adjoining the eminentia capitata discovered a shallow defect more evident on slight possible supination. No fracture or displacement of ulna, condylus internus or other part of humerus. Reposition difficult. He succeeded by first adducting in flexion, then on full extension, making the greatest possible abduction with supination,

strong pressure being meanwhile exerted on the prominent head of the radius. On removing the dressing four weeks later, passive motion was still very painful and limited. Massage, etc. did not improve mobility. The radial head was so thickened and fixed that it was excised five months after the accident. The interposition of a part of the articular cartilage had prevented more than a limited fibrous union of the fracture. Even after this operation mobility was not greatly improved.

He mentions having casually seen a third probable case in a man æt. 28. It dated from a fall from a horse, in his sixth year. Motion in the joint was perfectly normal despite the still existing displacement.—*Arch. f. klin Chirg.*, 1886, Bd. 34 Hft. ii.

III. On Compression-Fractures of the Upper End of Tibia. By Dr. W. WAGNER (Königshütte). The only previous discoverable cases were two reported by Volkmann from the dissecting room. In these the internal condylus was splintered, a genu varum resp. an arthritis deformans resulting. The injury is a parallel to compression fracture of the body of a vertebra. Wagner has observed eight cases, one of which was shown, and still presented evidence of a fracture a year after the accident. The mechanism of the injury he believed to be always that in a fall on the feet, the femoral condyle or condyles force in the "roof of the tibia." Usually only the inner tibial condyle suffers the injury. However, both or only the outer one may be affected, a case of the latter coming to autopsy at the end of a month. The greater frequency of injury to the inner condyle is explained by the line of gravity passing nearer the inner side of the knee. Two of his cases occurred at the same time. While going down in a mine the basket descended the first 70 m. at the usual rate, but the second at great speed, everything rebounding on striking the bottom. One of the men specially stated that he had stiffened all his muscles before striking. There was moderate effusion into the joint on admission, the leg slightly flexed and in genu-varum position. The whole joint was sensitive especially below the joint-line. The parts swollen and the circumference below the joint line materially increased in com-

parison with the other side. Lateral motion at the knee-joint markedly increased. Such is the average symptomatology. In this case though lateral motion no longer exists, a slight genu varum persists (a deviation of 2 ctm. from the middle line as compared with 5 ctm. just after the accident). There is perceptible thickening around the tibial head, the circumference here being 3 ctm. greater than on the other side. No impairment in the use of the leg, however.

In slighter cases the trouble is less clear, and where the external condyle is alone affected certain symptoms will be correspondingly different. Wagner reports two autopsies, one a fresh case affecting the inner condyle, and one in a four-weeks-old case affecting the external. The cortical layer of the resp. tibial condyle was splintered, the arch indented and wedged into the compressed fissured spongy part, some of the semilunar cartilage being included. The cortical layer of the corresponding femoral condyle was also broken.

Extension with careful massage is recommended. Histories of the eight cases finish the article.—*Arch. f. klin. Chirg.*, 1886, Bd. 34 Hft. ii.

W. BROWNING (Brooklyn).

**IV. Bone-Grafting in Cases of Extensive Loss of Substance.** By M. PONCET (Lyon). From a child, æt. 11, the author removed the entire right tibia excepting the superior articular surface; the portion extirpated was 30 cm. long and but 15 or 16 ctm. of periosteum was preserved. After several series of grafts a useful tibia permitting locomotion was produced; the repair was complete in the ninth month. The author considers this practice of advantage in extensive losses of bone substance, such as are observed after acute necrosis of long bones in children and adolescents or after compound fractures, when a considerable portion of bone has been sacrificed, since it will obviate to a certain extent the shortening of the diseased member and above all permit the conservation of its functions by assuring the solidity of the skeleton. In infectious epiphyseal osteitis, the resection should not stop with the removal of the necrosed bone, but extend to the neighboring bone, ulna or fibula, taking care to make

the section within the epiphyseal cartilage, in order to prevent the growth of this bone beyond its fellow and the resulting deformity. For the success of bone grafting, certain conditions are indispensable both to the transplanted fragments and the point of implantation. (1) The grafts should be small, not exceeding six to eight millimetres in length and three to four in thickness ; they should include the periosteum and be taken preferably from parts of the skeleton where ossification is the more active ; whenever possible the bones of the new-born, dead without pathological taint, should be used ; limbs amputated in consequence of traumatism may also furnish material for bone grafts ; so also with the bones of young animals. The fragments should be detached carefully with a strong scalpel, never with a saw, in a direct parallel to that of the bone ; the surface of the section should be smooth, and present no projecting laminae. (2) The place of implantation plays an important role in bone grafting. Implantation should be performed in the period of repair of the wound, when the inflammatory troubles have completely disappeared, when the granulations are healthy, vascular, rosy and suppurating but little, and when the edges have commenced to epidermize. The transplanted fragments probably never grow ; perhaps they are even absorbed after a greater or less time ; in any case, they enter for a certain time into the formation of the new bone, which they render firm and reinforce after the fashion of stone or brick in a substance capable of hardening. It is probable also that they awaken by their presence osteogenetic properties in the neighboring tissue. Antisepsis of the graft and of the wound is indispensable ; so also is immobilization such as can only be obtained by a plaster splint.—*French Congress of Surgery, Revue de Chir.*, Nov., 1886.

**V. Resection of the Knee.** By M. LUCAS CHAMPONNIÈRE (Paris). The writer deplores the unpopularity of this operation. Up to his first really aseptic operation, he had seen persistent fistulae, impotent limbs, secondary amputations and an elevated mortality follow the operation ; since then, he has performed nine operations, bringing the number up to ten, nine being for tuberculous arthritis and one for

arthritis deformans. He has performed no resections in individuals under seventeen years of age, considering it a bad operation in children. The oldest of his patients was fifty-four years of age : he had arthritis deformans and the resection was followed by complete cure. One of these operations has given a really excellent result ; it was upon a man æt. 33, who was unwilling to wear any apparatus, but after five months, he waxed the hospital floor. In two cases the apex of the lung was clearly affected ; they were cured however and the condition of the lungs was greatly improved : as a general thing even very notable lesions of the apex of the lung need not deter the surgeon from operating. The time required for the cure varied from eight to fifteen days : 8 of the cases were entirely cured at the end of three weeks ; in one the suppuration lasted a month and amputation became necessary, from which the patient made a good recovery. Eight of the patients walk : one suffered amputation in the thigh, and the tenth was a woman who had done very well, but will not walk owing to hysteria.

When should resection of the knee be performed? Excepting in children, it should be done at all ages in patients who have not extensive fistulæ. The incisions should be very extensive, to discover and remove all fungosities ; he attaches great importance to this ; perhaps their destruction may be secured by suppuration, as Ollier has said, but it is a doubtful and dangerous plan. [In the discussion, M. Ollier stated that he now preferred complete ablation of the fungosities by scraping or cauterization in tuberculous cases. J. E. P.] and the surgeon must endeavor to obtain primary union if he wishes to have a solid member. He makes free drainage through the popliteal hollow and removes the drains on the eighth or tenth day. He always sutures the bones with catgut.

The after-treatment is of capital importance. The first appliance has a preponderating influence on the result. The time necessary to obtain consolidation is extremely variable ; some patients have a solid leg at the end of three months. The operation is successful if there be little suppuration ; he is disposed if free suppuration appears, to amputate promptly.—*French Congress of Surgery, Revue de chirg.* Nov., 1886.

**VI. Orthopedic Resections.** This subject was the order of the day on the third day of the last French Congress of Surgery. M. LAGRANGE (Bordeaux) reported a case of traumatic arthritis of the left elbow in a man, æt. 35, resulting from a shot-wound. Suppurative troubles persisted in spite of a partial resection; a year later, the patient presented multiple sinuses penetrating the joint, with considerable enlargement of the humeral extremity and the olecranon. The joint was resected according to the method of Ollier, the patient recovering rapidly with a useful arm.

D. MOLLIÈRE (Lyon) strongly advocated osteoclasis according to the method recently devised by Robin, which consists of fixation of the skeleton by compression of the soft parts to the utmost, by which the bone can be fractured at any desired point. In congenital dislocations of the hip, osteotomy and resection of the head of the femur are good operations, but he has succeeded without cutting operations.

He objects to anterior and posterior tarsectomy that they are serious and sometimes fatal operations, and would substitute for them, osteoclasis, an operation which has no mortality. Osteoclasis of the tarsus has given very good results, but it should be remembered that club foot cannot always be corrected by treating the foot alone; deformities may occur in all the bones of the lower extremity; there are many cases, where a resort to supra or intra-malleolar osteoclasis is necessary for the correction of a club foot.

In rachitis, there are often curves such that it seems that the soft parts would prevent straightening and a cuneiform resection would seem to be necessary; in reality, the contraction of the soft parts can be overcome by progressive straightening and continuous traction; as immediate straightening is not necessary, orthopedic resection should be rejected in these cases.

In ankylosis of the elbow, resection is of the greatest advantage, as securing a useful limb, except in certain forms of ankylosing rheumatism, in which the ankylosis is sure to recur. In ankylosis, consecutive to coxalgia, he would substitute a sub-trochanteric osteoclasis. In ankylosis of the knee-joint, he considers resection bad because of the excessive shortening and, and as osteotomy has no advantage over osteoclasis, the latter is preferable.



M. RECLUS (Paris) considered that the progressive straightening in rachitis is not always necessary. He had performed osteoclasis with the apparatus of Collin in one case; after the fracture, muscular contraction prevented any reduction; subcutaneous section of the sural triceps permitted immediate reduction, and the result was all that could be desired.

M. GROSS (Nancy) concluded from anatomical and pathological observations and from clinical results, that; (1) orthopedic resection is indicated in ancient and congenital varus; (2) the preferable operation is resection of the astragalus or posterior tarsectomy, with resection of the great process of os calcis if needed, and assisted by subcutaneous tendinous and aponeurotic section; (3) the immediate and secondary results are favorable and recurrence is not to be feared; (4) certain cases of congenital club foot demand early resection; (5) resection of the astragalus is also indicated in cases of old acquired talipes varus, when the deformity and vicious position of that bone are recognized; such is the case in certain cases of paralytic club foot, the origin of which extends back to near birth, and where these modifications have resulted from the influence of locomotion and from the impediments to the regular development of the skeleton of the foot, afforded by the deformity; (6) the immediate result is entirely satisfactory; what the secondary result maybe depends upon the etiological conditions; (7) in acquired varus, where the skeleton of the foot is not deformed, resection is indicated only in the cases where the deformity is very pronounced; posterior tarsectomy gives little satisfaction and cuneiform tarsectomy should be resorted to.

ED. MARTIN (Geneva) rejects operative treatment of club foot for mechanical except in extremely exceptional cases. He advocates the method of Henry Martin of Lausanne, which is modified from Venel and consists of massage, manipulations and the application of apparatus. The treatment is divided into three periods:

1. period of preparation; 2. period of correction; 3. period of convalescence.

The first period consists of light manipulations, a sort of passive

gymnastics, to which he adds frictions, massage of the weakened muscles and sometimes electricity.

The second period differs from the first only by the greater energy of the manipulations and the substitution of the induced for the continuous current. The apparatus, which has the rare quality of being applicable to all varieties of club foot, is Venel's shoe, modified by Jacard and H. Martin. It is composed of a sole or board of wood, to which is fixed a steel plate provided with a socket for the reception of a lever the length of the leg, curved forward, backward or to one side, according to the deformity to be overcome, and finally a heel piece of flexible leather embracing the lower part of the leg and designed to maintain the heel firmly on the sole. This shoe permits locomotion and renders the most signal service in the treatment of club foot. In the treatment of talipes. he disapproves absolutely of the plaster apparatus, with which the flexibility and mobility of the joint so necessary for walking, cannot be obtained; it, moreover, favors atrophy of the muscles.

The period of convalescence begins when the deformity is sufficiently corrected for the child to be able to rest the sole of the foot and the heel on the ground. Then little boots provided with apparatus to retain the foot in a good position are applied.

H. Martin thinks that the results obtained in very young infants do not compensate for the disorders which active treatment may occasion. If the child is vigorous, manipulations may be commenced at the fourth or fifth month; but it is not proper to begin active treatment earlier than two months at least. The practicability of curing club foot by mechanical means is shown by the fact that several patients treated by Hippolyte Martin, the father of Henry Martin, have been able to enter the military service; but to secure a positive result, the treatment must be pursued patiently and regularly; it cannot be declared complete until ossification is completed. In 180 cases of club foot treated by H. Martin, but one was subjected to operation.

M. OLLIER (Lyon) remarked that for ankylosis of the hip, subtrochanteric osteotomy was excessively benign. The question between subtrochanteric section and resection of the hip ought to be decided.

Although he had devised a procedure for giving mobility to an ankylosed hip, he confesses that the result is not equal to his hopes; he obtained a complete success in his experiments upon animals, but the static conditions in man and in quadrupeds are very different; a femur without a head, with a short straight neck, exposes the patient to ascent of the femur or rather descent of the pelvis, the consequences of which are grave; he has observed it after resection for pathological conditions and accordingly he rejects the typical resection in ankylosis of the hip, and practices the cuneiform osteotomy of Volkmann, which has the great advantage of permitting the choice of location and the avoidance, as much as possible, of the old suppurative foci; this is an important point, for the reawakening of these old suppurations, due to tuberculosis or osteomyelitis, is greatly to be feared. Resection is subject to the inconvenience of affecting ancient foci, which might remain stationary indefinitely and which may be relighted under the influence of operative traumatism. Osteotomy also permitting the correction of the deformity better, he rejects resection and considers subtrochanteric cuneiform osteotomy as the method of election. Osteoclasia would undoubtedly be better, if the exact point of fracture could be fixed, but it is uncertain.

For the knee, he is not opposed to osteoclasia, since he instituted supra-condyloid osteoclasia and has obtained good results from it. He approves it for ankylosis at an obtuse angle and even at a right angle, but positively rejects it for ankylosis at an acute angle. In that case, the knee would be higher than the point of fracture, which is a deplorable result. It is necessary then in this case to renounce osteoclasia (which, besides the orthopedic inconveniences, incurs the danger of awakening old inflammations) and resort to the chisel or knife.

J. BECKEL (Strasburg) had performed 20 resections, properly called, which were unreported, as follows: Nine resections of the elbow; 1 subtrochanteric resection of the femur; 3 resections of the knee; 3 tarsotomies; 4 pseudarthroses, all of which were followed by cure. Of the 9 resections of the elbow, 2 were done for ankylosis consecutive to articular tuberculosis, and 7 for old traumatisms, of which 4 were dislocations and 3 badly consolidated fractures. The fungosities

recurred in the first two cases. From the standpoint of secondary result, these two have given the least good result; in one there was an ankylosis at a right angle, and in the other a swinging but nevertheless very useful member. The 7 traumatic cases have given 4 perfect results and 3 results, less perfect in that the subjects have never been able to flex the arm beyond a right angle.

The 3 knee joint resections were done, 1 for arthritic deformity consecutive to traumatism, and 2 for vicious ankylosis after fungous arthritis. The three cases were cured with a straight limb; in the oldest (52 years) the consolidation was not effected until the 13th month; in the other two it was satisfactory on the 19th and 20th day. Of these three patients the oldest worked for three years; then suffered amputation for fungous arthritis and recovered. The youngest died of tuberculous meningitis three days after having undergone resection of the opposite hip and four months after the resection of the knee. The third remains well after three and a half years.

Only one of the three tarsotomies has given a perfect result; in the other two the result has been mediocre. They rest the sole of the foot on the ground, but there is a marked tendency to adduction. The resection then was not extensive enough, in spite of the extirpation of the astragalus, the scaphoid and the external malleolus. A supplementary resection to include the cuboid and a portion of the os calcis should be made. He dwells upon this fact to show that tarsotomy was indicated, and that forced correction—which, indeed, had been performed—could not be counted upon, and still less apparatus. Besides, in these three cases, the new tibio-tarsal articulation is mobile, and there is no trace of ankylosis.

In the pseudarthroses, the fourth case was a complete failure; it was an old pseudarthrosis consecutive to an osteoclasia in a child of 13; two previous attempts had failed. When this third operation was done, the atrophy of the fragments was considerable, the fibula slender and the tibia not thicker than a penholder. The leg was also atrophied and shortened 16 centimetres. In these conditions cure was hardly to be hoped for and amputation would have been better if the parents had consented. The other three cases were followed by positive success.—*Revue de Chirurgie*, Nov., 1886.

VII. Fracture of Humerus with Interposition of Soft Parts and Operative Replacement. By FREDERICK LANGE, M. D. (New York). A boy, æt. 10, fell about 8 feet, striking on his right shoulder and sustaining a fracture of the femur, immediately below the head; the lower fragment had apparently perforated the deltoid muscle and, with a sharp edge, was fixed in the deep layers of the skin without penetrating it. A distinct protrusion was formed on the anterior aspect of the shoulder, the elbow being thrown backward so that the axis of the bone was directed abnormally in front. The lower fragment could not be released from its abnormal attachment, even when, after the swelling and tension had markedly subsided, on the seventh day, the patient was put under ether. An incision was then made over the displaced fragment and the slit in the deltoid enlarged. A separation was found in the epiphyseal line as far as the middle of the bone whence a line of fracture went in an oblique direction downward and backward, its lowest point being about two inches below the epiphyseal line. In order to bring the fragments into proper apposition, it was necessary to elevate the arm above the horizontal line and to give it a decided outward rotation, at the same time bringing it slightly forward. The periosteum and fibrous attachments on the edge of the upper fragment were not torn exactly in the line of the fracture, but at a short distance below, so that they overlapped the edge of the upper fragment and had to be turned up, a condition similar to that found in fractures of the patella. The periosteum had to be slightly indented and then coaptation could be effected. The long head of the biceps was not torn, but lifted out of the groove and dislocated to the inner side; with the lower fragment, it returned to its normal relations. Union without necrosis, and complete cicatrization ensued. The upper fragment, by the action of the muscles inserted into the greater tuberosity, was abducted and rotated outward; consequently, during the after-treatment, the corresponding position of the arm was maintained with slight extension and a splint passing from the posterior aspect of the arm over the back to the opposite scapula. This way of treating fractures of the uppermost extremity of the humerus had recently been recommended by Bardenhauer. The author had lately treated a case

of fracture of the surgical neck of the humerus in the same way with success. It confined the patient to his bed for a long time, but it certainly secured the physiological relation of the fragments.—*N. Y. Surgical Society*, Nov. 22, 1886.

## GYNÆCOLOGICAL.

**I. The Advantages of Dilatation in the Curative Treatment of Cancer of the Uterus.** By M. VULLIET (Geneva). The method permits the operator to see up to the fundus, and the lesions can be ascertained by sight. This has been of importance in cases where cancer was found to have extended higher up in the cavity of the body than would have been supposed otherwise. When the lesion is superficial, the surface is scraped with the curette and then with the nail, by which the resistance of the tissue can be appreciated, the scraping being continued until muscular fibres are brought away. Then it is cauterized with red heat or chloride of zinc. At the end of fifteen days the eschars separate. Then the cervix is again dilated to see if the whole growth has been removed. When the lesions are too far advanced for curative treatment, a more moderate dilatation will transform the uterus from a deep sinus into an open wound, easy to disinfect. The author has treated 17 cases by this method; laying aside those judged to be curable at the outset, cicatrization was obtained in 5 cases out of 7 where curative treatment was undertaken.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**II. Vaginal Hysterectomy.** By G. RICHELLOT (Paris). Thirty operations have been done by the author's method, ten of which he performed himself. The operation consists of three steps: The isolation of the uterus, the treatment of the broad ligaments, and finally the treatment of the wound. Hitherto the dangers of vaginal hysterectomy have been due mainly to the difficulty of placing firm ligatures on the broad ligaments. He has proposed a means of meeting the double purpose of: (1). Assuring hæmostasis. (2). Shortening the duration of the operation. This is the use for compression of the broad ligaments of long forci-pressure forceps, which may be left in



the pelvic cavity for twenty-four or forty-eight hours. This plan extends the field of hysterectomy. It permits the removal of uteri which are not very mobile. There is no need of special appliances for drainage, the forceps being sufficient for that purpose. Every uterine cancer amenable to operation, aside from outside considerations derived from the age or general condition of the patient, should be removed by hysterectomy. Even in small cancers the entire uterus should be removed under penalty of recurrence. The suprapubic operation of Freund which is infinitely more difficult and more grave, should be abandoned for the vaginal operation. For cancer, total hysterectomy is preferable to infra- or even supra-vaginal amputation. Total extirpation is not so dangerous as has been held, and there is no doubt but that greater perfection of methods and experience of operators will greatly improve the statistics of the operation. Certain authors say that the cancer is either at the beginning when amputation of the cervix is sufficient or that it is advanced and all operation is useless. This specious reasoning omits entirely all cancer beginning in the mucous lining of the cervix and those, more rare it is true, beginning in the body. The partisans of amputation of the cervix have produced statistics to show that recurrence is as frequent and even more so after total than after partial ablation, but they perform ablation only in cases where they judge a partial operation to be entirely useless, reserving extirpation for desperate cases.

Vaginal hysterectomy should not be reserved for cancer alone. As the gravity of an operation diminishes, the indications increase. Now vaginal hysterectomy is no more grave than a simple ovariectomy, as shown by statistics. Leopold has published 26 operations with but 2 deaths; Klotz has given a series of 17 without a failure; the author has performed 10 hysterectomies with but three deaths, a mortality of 30%. Seven of his cases were cancerous, three were operated upon for other reasons, and all of the latter were cured. The first death was due to hæmorrhage, an occurrence which would not happen now. By reason of its benignity, vaginal hysterectomy should be utilized for the treatment of non-cancerous affections, and non-recurrent lesions should be considered the most interesting indications for the operation.

Painful hæmorrhagic fibromata, which could pass through the pelvic strait, and even those which would have to be extracted piecemeal, are within the province of this operation. So also some grave retroflexions, in which other means have failed, obstinate prolapsus in which anaplastic operations have not been successful, inversion of the uterus, and perhaps certain cases of utero-ovarian neuralgia.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**III. Torsion of the Pedicle of Ovarian Cysts.** By M. TERRILLON (Paris). All ovarian cysts with long enough pedicles, if they are free from adhesions, turn upon themselves. If the torsion is moderate it passes unperceived, but if it is greater, grave consequences may result on the part of the tumor, intra-cystic or intra-parietal hæmorrhage, or an augmentation of tension may determine the rupture of the cyst. All these accidents may be imputed to the impediment to the circulation produced by the torsion. When the pedicle is twisted, the veins are compressed before the arteries. Consequently, blood may still enter the tumor which cannot return. But the torsion may extend still farther, all the vessels become obliterated and the cyst become gangrenous. Finally, in still other cases, the pedicle is completely ruptured, and the cyst is bound to die unless it may derive nutriment through vascular adhesions. One of the almost constant consequences of torsion of the pedicle of ovarian cysts is the determination of nutritive troubles in the cysts, the first result of which is the alteration and the exfoliation of the epithelium which normally covers them. This denudation determines the formation of adhesions, which may be favorable to a certain point, since they may prevent gangrene of the cyst, but they always have the extreme inconvenience of rendering the operation very laborious, often even impossible.

In 100 cases, the author has met with torsion of the pedicle four times, not counting incomplete torsion. In three cases the pedicle seemed as if interrupted by a fibrous cicatricial ring. The adhesions were considerable, and rendered the operations very laborious. In the other case the pedicle was completely separated, and its two ex-

tremities were found adherent, one to the cyst and the other to the cornu of the uterus. The cyst had been able to live by deriving its vascularization from numerous adhesions which singularly complicated the operation.

From a clinical standpoint, four classes of cases may be distinguished: (1). Those in which the torsion occurs so slowly as to cause no accident; however, adhesions are formed even in these cases. (2). Those which are announced by slight accidents or by the pains of meteorism and which then pursue the same course as the preceding. It is in these cases that the cyst may diminish and disappear by slow absorption. (3). Acute cases which are announced by accidents, acute but of brief duration. (4). Cases of rapid and complete strangulation which are accompanied by peritoneal troubles, grave and often fatal—rupture of the cyst, intra-cystic hæmorrhage. The conclusion to be drawn from these facts is that ovariectomy without previous puncture should quickly be performed. In acute cases with peritonitis, surgical intervention is indicated and gives excellent results. In chronic cases, early intervention is clearly indicated, for it permits ready destruction of adhesions, which it may not be possible to overcome later. Even in cases of former mortification, with indestructible adhesions, a cure may yet be hoped for by freely opening the cyst and causing suppuration with drainage.—*French Congress of Surgery, Revue de Chirurgie*, Nov., 1886.

**IV. Cases of Torsion and Rupture of the Pedicle of Ovarian Cysts.** By M. HEURTAUX (Nantes). The first occurred in a woman who had for about a year an ovarian cyst of small size, which had determined three attacks of peritonitis without apparent cause. During the operation there was observed: (1). A brown color of the cyst wall giving the appearance of marked congestion. (2). Numerous recent adhesions. (3). The color of the liquid which was bloody and dark as of venous blood. (4). The torsion of the pedicle which had made three or four complete turns. The patient recovered after some symptoms of peritonitis. On examination, a multitude of openings were observed on the internal face of the

cyst where the pressure had caused the venous blood to exude, resulting probably from rupture by excess of intra-vascular pressure after the torsion.

The second patient was an extremely emaciated woman, æt. 34, who had had two attacks of peritonitis. There was a large cyst of the right ovary. The uterus was immobile, and in the posterior cul-de-sac a hard tumor, which appeared to be a uterine fibroma, could be felt. On operation, after the large cyst was removed, another not larger than the fist, having for a pedicle a long adhesion to the inferior extremity of the mesentery, was found lying in the sac of Douglas. The patient died after 50 hours. Examination of the detached tumor showed that it was a cyst of the left ovary. On its surface were found traces of the ovarian ligament and Fallopian tube ruptured near the uterus. The surface of the rupture was irregular and ancient, and there was no trace of torsion. The author rejects the hypothesis of torsion for this rupture, and considers it to have been due to the pressure exerted on the small cyst by the large one.—*Société de Chirurgie de Paris*, Oct. 13, 1886.

JAMES E. PILCHER (U. S. Army).

**V. Severe Puerperal Disease Cured by Amputation of the Septic Uterus.** By B. S. SCHULZE (Jena). Author reports the following case. Patient, 21 years of age, gave birth to a seven months child. The umbilical cord was torn away by the midwife, in attempting to remove the placenta. A few hours later the cervical canal was so reduced in size, that it was impossible to reach the placenta. Warm baths, the application of the galvanic current and deep narcosis, tried during the two following days, failed to enlarge the canal, which only just admitted one finger. On the evening of the second day there was considerable elevation of temperature, and a chill, with putrid discharge from the uterus. Disinfecting irrigation of the uterine cavity frequently made. On the evening of the third day, the attempt was again made, in deep narcosis, to reach the placenta. One finger alone could be introduced, and by means of this it was ascertained that the uterus was double at the fundus, the left cavity being empty, while in

the right the placenta was firmly adherent. During the next two days, the fourth and fifth, there was considerable fever, accompanied by chills and symptoms of peritonitic irritation. Operation in the morning of the sixth day. Laparotomy. After the uterus had been drawn forward with the hand, and a rubber tube passed around the neck, incision was made and the offensive smelling placenta removed. The destruction of tissue in the wall of the uterus reached to within 2 mm. of the peritoneum. The left half of the organ was also much discolored. Several portions of the intestines lying nearest the uterus were much injected, having a granulated appearance. No exudation in the abdominal cavity. The infundibulo-pelvic ligaments were tied and divided, the uterus and ovaries drawn well forward, and the former amputated. Schultze prefers suturing the stump of the amputated uterus and replacing it, according to Schroeder's method. In this case, however, the surface of the wound was too suspicious looking, and Hegar's method of suturing the stump in the abdominal wound, was carried out. The latter was then closed and the end of the stump cauterized. This was afterwards treated with chloride of zinc. The temperature remained during the same day below 37 (Celsius), rose to 40, 2 during the next two days and then decreased. Two weeks later no fever. Superficial gangrene attacked the stump, extending to the abdominal walls, where it soon localized itself. On the ninth day after the operation the stump could be removed, with the scissors. The rubber constrictor was withdrawn on the eleventh day, and the remaining sutures in the abdominal wound, on the thirteenth day. Patient made a good recovery. At no time did any peritonitic symptoms appear. The septic condition of the uterus in this case was owing to the retention of the decomposing placenta, and this was due partly to the malformation of the uterus. Retention of the placenta in cases of normal uterus, and septic infection of the puerperal uterus without retention of the placenta, may both give rise to the same indications for an operative procedure.

Author considers the operation indicated ; firstly, when the source of the infection is known to exist in the uterus and is not removable through the genital tract ; secondly, the only source of infection threat-

ening life, must be confined exclusively to the uterus ; thirdly, in cases, where it is ascertained that no other sources of infection, more centrally situated, in all probability exist, such as thrombosis or embolism.

The knowledge, however, that portions of the placenta and even the whole of this, may remain for months in the uterus without causing any infection ; and furthermore the fact that many women recover from severe puerperal infection, must necessarily limit the indications very materially.—*Deutsch Med. Wochensh.* Nov. 4, 1886.

C. J. COLLES (New York).

## WOUNDS, INJURIES, ACCIDENTS.

**I. Rupture of Tendon of Quadriceps Extensor on Both Sides.** By M. ED. BLANC (Lyons). A man, æt. 51, while carrying a heavy weight, slipped and fell backwards, feeling a violent pain in his right knee, accompanied by a sensation of tearing. Carried home, he lay up a fortnight, and when all swelling about the knee had subsided under the use of leeches, he got about. He kept on at his occupation of a glazier for a year, when one day, losing his balance, he again slipped, and made a violent effort to save himself from falling backwards. He at once felt in the left knee the same sort of pain and cracking as he did in the right a year previously. In bed six weeks, with swelling of the knee and much pain. Cold dressings were applied. He then got about on crutches, and being unable to work, sought advice for first time. When standing up, the slightest pressure or weight suffices to make him fall ; in fact, a cat brushing past him upset him one day. The local condition is interesting. Right knee : when flexed, the condyles are most clearly seen projecting with a hollow between them, and the sharp upper border of the patella is felt in relief, with no fibres attached to it. The finger can be pushed down with the skin in front of it, into a large hollow behind the patella and between the condyles. When the leg is extended, the patella is extremely mobile. The left side differs only in there being a more complete severance of the tendinous fibres of the vasti muscles, allowing greater mobility of the patella. A good illustration accompanies the description of the knees.



Out of 43 actually reported cases of these tendinous ruptures, there are only 11 double ones. Binet and Nélaton place the rupture one or two inches above the border of the patella, but here there seems to be a regular tearing away of the fibres from their bony attachment. The fact of the second accident happening after a year's interval agrees with Malgaigne's explanation of the patient having to put the sound limb to greater exertion. There is no hope for improvement here. Ruptured tendons mend by cicatricial tissue which cannot occur here as there are not two ends for the reparatory tissue to be thrown out between. Suturing would not do, as in the absence of a lower end it would not be tempting to sew the musculo-tendinous stump to the bare bone of the patella. To an apparatus is the only resource, one with supports on each side, a hinge allowing slight voluntary flexion, and with a strong pad of caoutchouc to replace the tendon.—*Lyon Medical*, Oct., 31, 1886.

L. S. MARK (London).

## REVIEWS OF BOOKS

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A TEXT BOOK ON SURGERY: GENERAL, OPERATIVE AND MECHANICAL  
By JOHN A. WYETH, M.D., New York. D. Appleton & Co. 1887.

Professor Wyeth's book is an attractive book ; in a single, not very bulky volume, the pith and marrow of modern surgery is given. The scope of the work is comprehensive ; so extensive a field could be covered in a single volume, however, only by the use of great condensation and brevity of treatment. The skill with which this has been done is very noticeable, and yet it is impossible that in many instances matters that a reader would like to find treated of are omitted, or merely suggested. Thus, such subjects as Pyæmia Septicæmia and Scrofula, are not included among the subjects discussed. This has necessitated also in many instances positive statements, which the author no doubt would have qualified, at least to the extent of giving the views of others differing from his own, if the scheme of his work had been more elaborate. In the matter of the part which micro organisms play in the production of various surgical diseases, or in the disturbances of wound-repair, is the criticism which has just been made particularly valid. The entire mass of research as to the relations of micro-organisms to suppuration is contained in the simple brief statement that pus corpuscles and the liquor puris from all acute abscesses contain certain micro-organisms known as micrococci and bacteria, and that their "chief significance is that they give to pus a septic power, or that pus which contains them injected or absorbed into the blood produces septic fever—a condition which does not follow the injection of pus which does not contain these elements."

Diffuse cellulitis and phlegmonous erysipelas are also dismissed without any reference to the doctrine, so widely accepted by many surgeons of the greatest authority, that they are the results of infection by septic organisms derived from sources external to the body. A diffuse abscess, he says, results from the property which pus possesses under certain conditions of dissolving all connective and embryonic tissue. It thus meets with no barrier to its progress, and general infiltration occurs. He mentions, it is true, that some observers have considered that a specific micrococcus was the cause of erysipelas, bu

adds: "The fact that it has been wanting in some instances examined by careful investigators would seem to disprove this theory"—and with this he leaves the subject. The specific organism of gonorrhœa is dismissed in about the same way. The vast subject of tubercular infection, in its multiform phases, receives but scant recognition throughout the work. Thus, in treating of the causes of vertebral caries, the only hint that one can get that in any case there may be a relation between tuberculosis and the disease is to be found in the statement that "any disturbance of the normal process of nutrition in the tissues in general—as in the syphilitic, tubercular, gouty, or rheumatic dyscrasiæ—or the impairment of vitality resulting from any acute disease, predisposes to inflammatory changes in the bones, and especially in the cancellous tissue of the vertebræ."

Destructive arthritis is spoken of in almost the same terms. In the production of that form of *ostitis* which leads into arthritis, he believes that the prime cause is capillary rupture in the cancellous expansion near the articular surfaces. He gives no opinion nor suggestion as to the influences which in some cases convert this simple traumatism into a progressive destructive process, beyond the statement that children suffering from any dyscrasia which not only renders the capillary walls less strong, but lessens the reparative power of the tissues involved in the area of extravasation, are the ones in which such capillary ruptures are most frequent. To this he adds: "I am not inclined to accept the opinion which prevails to a considerable extent, especially with German surgeons, that tuberculosis is so frequently the cause of *ostitis* as is asserted. Tubercular *ostitis* is not rare, but non-tubercular *ostitis* is believed to be more frequent."

Other examples might be given, but these must suffice. They show that the author still occupies a very conservative position with regard to much that has characterized the teachings of the more progressive and enthusiastic of the modern school of antiseptic surgeons.

Antiseptic methods in the making and dressing of wounds are accepted, however, as now established as the best beyond argument, because they embody "the great principles of cleanliness and carefulness." No endorsement is given, it will be seen, to the elementary principles upon which these methods are founded, or their relations to the activity of morbid germs. The first chapter is devoted to Surgical Dressings, including in these the materials now most in vogue in the dressing of wounds according to the antiseptic practice of the day. It concludes with a description of the method of preparing sublimate gauze and borated absorbent cotton.

Beyond these two substances, as absorbents for wound-discharges, he says: "Nothing is really needed. Pads or bags of peat, sawdust, jute, wood-wool, etc., are practically useless."

There are certainly many who do not share in this opinion, for they have found in suitable pads containing sawdust, moss, or similar material, a dressing not only more easily procured and prepared, more cheap and generally available, but also more certainly absorbent than any kind of prepared cotton.

The subject of anæsthesia occupies a chapter by itself. The use of cocaine for local anæsthesia is fully described. For purposes of general anæsthesia, most positive preference is given to ether. All of the objections to ether, it is said, fade into insignificance when brought face to face with the fact that about seven lives are sacrificed by chloroform to one by ether. According to the author, chloroform is fast disappearing in practice. These statements might be questioned by some; there are remote dangers of respiratory disorders and kidney congestions fairly attributable to the use of ether, which in quite a proportion of cases determine delayed fatal results; these deaths, it is possible will be charged up to the account of ether by and by, and then possibly the disproportion between the accounts of the two agents will not be so great. At present the jury is divided on the question of ether vs. chloroform.

The chapters on Amputations, Aneurisms, and the Ligatures of Arteries are especially good. The illustrations are copious and clear. By the use of color, the vessels are made exceedingly distinct. It is believed that this is the first time in which this use of color in illustrations of this kind has been made in a surgical text-book.

It is impossible to take up in detail for examination each of the twenty-one chapters of this very interesting book. Its teachings are clear and positive. Its shortcomings, if they be judged such, are upon the side of conservatism. As a handbook for the use of students it is unexcelled; its convenient size—less than eight hundred pages of royal octavo, its clear print, its many and excellent illustrations, its practical character, will all combine to commend it to the use of many readers.

L. S. PILCHER.

TRANSACTIONS OF THE AMERICAN SURGICAL ASSOCIATION. Volume IV. Edited by J. EWING MEARS, M.D., Recorder of the Association. P. Blakiston, Son & Co., Philadelphia. 1886. 8vo. pp. 240.

This volume contains the papers read before the American Surgical

Association at the meeting held April 28 to May 1, 1886, together with a report of the discussions upon these papers. The address of the president, Prof. Moses Gunn, on the union of nerves of different function considered in its pathological and surgical relations, opens the volume. This is followed by Dr. Christopher Johnston, on Diagnostical Laparotomy; by Dr. Harold C. Ernst, on the Bacteria of Surgical Diseases; by Dr. N. Senn, on the Surgery of the Pancreas; by Dr. T. F. Prewitt, on Traumatic Aneurism of Internal Carotid Artery following Gunshot Injury; by Dr. Roswell Park, on Lipoma Testis, and also a report of a Successful Nephrectomy on a patient of twenty-three months; by Dr. W. W. Keen, on Stretching of the Facial Nerve; by Dr. C. T. Parkes, on Two Cases of Cholecystotomy; by Dr. C. H. Mastin, on Subcutaneous Division of Urethral Stricture; by Dr. Roswell Park, on An Improved Tracheotomy Tube. The readers of the ANNALS OF SURGERY have already been familiarized with the contents of these papers either by their publication in full in this journal, or in abstract in its editorial or index departments. They form a series of papers of great value, which testify to the high character of the association by which they were called out. The range of subjects presented, and the widely separated points of residence of the authors, correspond with the national character of the association. Each annual addition to the series of volumes, in which the transactions of this society are preserved, increases the value of the whole series.

L. S. PILCHER.

HANDBUCH DER CHIRURGISCHEN TECHNIK, BEI OPERATIONEN UND VERBAENDEN, VON DR. ALBERT VON MOSETIG-MOORHOF, A. O. Professor an der Wiener Univ. etc., mit vielen Abbildungen. X-XII, Lief. Vienna, 1886: Toeplitz and Deuticke. (New York: G. E. Stechert). [*Handbook of Surgical Technique Pertaining to Operations, Wound-dressings and Bandaging*].

The final portions of this work, which has been in press since March, 1885, are now at hand, treating of operations upon the trunk and on the extremities.

The complete work comprises nearly 900 large octavo pages, and is handsomely printed on fine paper. - Two hundred and thirty woodcuts, illustrating methods of operating and of bandaging, as well as instruments and appliances, are interspersed in the text.

The object of the author was to provide a book for the use of students and those beginning the practice of surgery, which should present in as concise a form as possible, a description of all operations

and manipulations which are likely to occur in surgical practice. He points out what discrepancies are frequently found between acquired theoretical knowledge and real practical skill in the case of young surgeons just commencing their term of service in the wards of hospitals. And it is professedly to meet the requirements of these that the book has been written.

For this reason only the technical side of the subject has been treated—although short notices of the indications and contraindications, as well as of certain mishaps and complications, and a few anatomical notes have been admitted in the text; and some critical notes upon the relative value of different operations are also occasionally inserted.

The contents of the book embraces chapters on anæsthetics, treatment of wounds, elementary operations, operations touching the different tissue-systems, bandaging, and all the major operations—the latter arranged according to the anatomical regions.

The book is well up to date, and in view of the eminence of the author and his activity in advancing modern surgery cannot be too highly recommended to all those who desire a German book of this kind for reference.

W. W. VAN ARSDALE.

CHIRURGISCH ANATOMISCHES VADEMECUM FUER STUDIERENDE UND AERTZTE VON W. ROSER, Professor der Chirurgie an der Univ. Marburg. 7 Aufl. Leipzig, Veit & Co., 1886. (New York: G. E. Stechert). [*Vademecum of Surgical Anatomy*].

This handy little volume, giving the main anatomical data in their typographical relations from a surgical point of view, and illustrated by 133 wood-cuts, is now before us in its seventh edition, which sufficiently shows what a favorite it has become.

The majority of the wood-cuts represent topographical dissections made after removal of portions of the integument—so-called fenestrated sections; and the text contains many notes of a clinical character and applications of the anatomy to practical surgery.

Each anatomical region is separately treated, the different tissues of each being reviewed in turn. A table of muscles with their nervous supplies, giving the insertions, etc., is appended. The whole book contains 270 small octavo pages.

In the preface the author remarks that the object of the book is not to enable the student to do away with anatomical dissections on the cadaver, but to guide him in making fenestrated sections.

W. W. VAN ARSDALE.



REPORT OF THE SPECIAL COMMITTEE ON SURGERY OF THE TEXAS MEDICAL ASSOCIATION. Presented at the annual meeting at Dallas, April 27, 1886. GEORGE CUPPLES, M.D., Chairman and Reporter.

This is a condensed statistical report, covering the work of one hundred and thirty-eight different surgeons in the state of Texas, and includes 4,293 operations. These are classified under fourteen heads, a synoptical résumé of each class is also given, and a summary of this synopsis in addition is furnished. This latter table is as follows :

SUMMARY OF OPERATIONS ; RECOVERIES AND DEATHS IN EACH CLASS.

Number.		Operations	Recoveries.	Deaths.	Ratio of Recoveries.	Ratio of Deaths.
1	Amputations and Disarticulations	704	596	108	84 65	15 34
2	Resections in Contiguity and in Continuity	109	107	2	98 16	1 83
3	Ligation of Arteries	75	64	11	85 33	14 66
4	Tumors, noteworthy for Size, Site, Character, etc.	95	84	11	88 42	11 57
5	Operations involving Head and Neck	289	235	54	81 31	18 68
6	Operations involving Thorax	162	143	19	88 27	11 72
7	Operations involving Abdomen	242	212	30	87 60	12 39
8	Operations involving Rectum and Anus	469	465	4	99 14	0 85
9	Operations involving Male genital & Urin'y Orgs.	695	657	38	94 53	5 46
10	Operations involving Female " " "	851	797	54	93 65	6 34
11	Operations involving—A, Bone ; B, Joints	95	83	11	87 68	11 67
12	Plastic Operations	43	42	1	97 67	2 32
13	Operations on Organs of Special Sense	180	180	0	100 00	0
14	Miscellaneous Operations	284	277	7	97 56	2 43
General Total,		4293	3943	350	91 84	8 15

Of these 2,080 were major operations, with 331 deaths (15.91 per cent.), and 2,213 were minor operations, with 19 deaths.

The following table of serious wound-diseases and accidents that complicated these operations is of special value for the purposes of comparison with the statistics of the same sort derived from the experience of crowded city hospitals under strict antiseptic régime.

## SUMMARY OF CASES OF SECONDARY HEMORRHAGE, TETANUS, GANGRENE, PYÆMIA, SEPTICÆMIA AND Erysipelas, WITH RATIO OF RECOVERIES AND DEATHS.

	Total Operations.	Number of Cases.	Recoveries.	Deaths.	Ratio of Recoveries.	Ratio of Deaths.	Ratio deaths to total No. of operations.
Secondary Hæmorrhage	}	38	30	8	78 94	21 05	0 18
Tetanus		14	2	12	14 28	85 81	0 27
Gangrene		10	5	5	50 00	50 00	0 11
Pyæmia		7	0	7	0 00	100 00	0 16
Septicæmia		11	1	10	9 09	90 90	0 23
Erysipelas		13	9	4	69 23	30 76	0 09
Total,	4293	93	47	46	50 53	49 46	1 07

In the matter of anæsthetics, chloroform was used in 3,179 instances, ether in 122 instances, and a mixture of the two in 132 instances. One death from chloroform is reported. In twelve instances alarming symptoms developed, not terminating fatally, that is, in one case out of every 266 where chloroform was given. Of the few cases in which ether alone was given, while no deaths are reported, in three instances, or one in every 41, alarming symptoms occurred. Neither death nor alarming symptoms are reported in connection with the cases in which the mixture of the two agents was employed.

Among the more important individual operations there are recorded eight disarticulations at the hip-joint, all required on account of gunshot wounds except one, which was for a railroad injury. Four of these were primary operations, and these all died. Four were secondary operations and these all recovered. Of thirteen abdominal hysterectomies for carcinoma, one only recovered. Of five vaginal hysterectomies, four recovered. One hundred and nineteen laparotomies of all kinds are reported, with forty-nine deaths. Fifty herniotomies with thirteen deaths; one hundred and thirty-nine lithotomies in males with eighteen deaths, five in females, with one death. Ninety-six tracheotomies for foreign bodies with three deaths; fifty-one for membranous or diphtheritic croup, with forty deaths.

As the reporter very justly says, this report gives the hard every-day work of surgeons, not in well-appointed hospitals, supplied with every means and appliance that modern science and the marvellous ingenuity of the age have placed at his disposal, but under the most difficult

circumstances, deprived even of necessary instruments, so that in some instances amputations have been done in a negro cabin with a bowie knife and a carpenter's saw.

The report is of great interest and value. The immense amount of labor involved in its compilation can only be appreciated by those who have themselves been engaged in like work. The committee hope that this report will be the starting point and model for annual reports hereafter. We sincerely join in this sentiment, and add the wish that the profession of Texas may long be able to avail themselves of the same industrious hand and patient enthusiasm which has accomplished this first report.

L. S. PILCHER.

# SHOULD LAPAROTOMY BE DONE FOR PENE- TRATING GUNSHOT WOUNDS OF THE AB- DOMEN INVOLVING THE VISCERA?<sup>1</sup>

By CHAS. B. NANCREDE, M. D.,

OF PHILADELPHIA.

PROFESSOR OF GENERAL AND ORTHOPÆDIC SURGERY IN THE PHILADELPHIA  
POLYCLINIC; SENIOR SURGEON TO THE PROTESTANT EPISCOPAL HOSPITAL  
AND TO ST. CHRISTOPHER'S HOSPITAL FOR CHILDREN.

MY chief object in presenting this subject for your consideration is a medico-legal one. A few years since the counsel for the defense in a famous murder trial asserted that the examination of the track of the ball by a probe in a penetrating gunshot wound of the abdomen, had turned the scale towards a fatal issue, cited many eminent authorities in support of this view, and urged the acquittal of his client of the crime of murder in the first degree. At present, the tendency seems rather towards the most active interference, to operations which in the most experienced hands cannot be denied to have a certain mortality *per se*, and which done promiscuously by those inexperienced in abdominal surgery will undoubtedly tend to render death more certain.

Laparotomy for these injuries has been guardedly endorsed by the American Medical Association, in a most emphatic manner by the New York State Medical Association at its last meeting, and by the Philadelphia Academy of Surgery. Nevertheless, protests have appeared in the journals from

<sup>1</sup>Read before the American Surgical Association at the annual meeting, May 4, 1887.

time to time, and although I was the first surgeon to venture upon the operation in Philadelphia, yet I feel impelled to ask that you most carefully consider what I advance, and after due deliberation express an authoritative opinion which may serve as a precedent for appeal. I say an "authoritative opinion" because it cannot be questioned that this body forms the highest surgical tribunal of the country. Some expression, for or against this operation, I look upon as imperative both in the interests of justice—that the guilty may not escape under pretense of improper treatment on the part of the surgeon—and that the surgeon may without fear of censure to influence his judgment, decide for or against laparotomy, solely in the interests of his patient.

The questions that must be decided are: What are the tendencies of the injury, are they towards recovery or death? When death takes place, what are its causes? When recovery ensues, what conservative processes occur? How likely are these conservative processes to take place, and what favors or prevents them? How reliable are unaided natural methods compared with those art affords, and should they be imitated by the surgeon or avoided? Finally, what are the dangers inherent to the operation of laparotomy and what advantages does it offer?

A preliminary consideration of the results of the experiments of Wegner and Grawitz will explain many otherwise inexplicable clinical facts, and clearly indicate the causes of the complications specially dreaded after ball injuries or a laparotomy, and how these dangers can be averted.

The first observer ascertained that the healthy peritoneum could dispose of ordinary air, serum, bile and healthy urine—any solid particles in these fluids being encapsulated—without any peritonitis resulting. When, however, air and putrescible fluids were simultaneously introduced in greater amount than could be disposed of *within a short time*, decomposition did occur, its products were absorbed and septicæmia resulted. A notable exception was that "living defibrinated blood never decomposed under these circumstances," an observation which seems to prove the truth of my suggestion that the presence

of fibrin ferment and probably its absorption, is one of the dangers of peritoneal traumatism.

Grawitz's experiments are singularly in accord with those of the earlier observer Wegner, especially those whereby he proves that even the presence of large numbers of the ordinary forms of micro-organisms produces no evil effects so long as the quantity of putrescible fluids does not exceed that amount which can be absorbed or safely encapsuled within a limited time. These experiments prove the truth of the assertions of certain ovariologists, that operations involving the peritoneum, provided due precautions be taken, are safer than most of those daily performed, since many species of micro-organisms can be introduced with impunity into the peritoneal cavity, while even the specific pus-producing forms cannot initiate suppuration except under certain conditions which can usually be avoided. Thus both observers found that "large quantities of the ordinary forms of micro-organisms," certain amounts of cholera-bacilli, or even of fæces, mingled with a putrescible albuminous substance like spleen-pulp, produced no peritonitis in the *healthy* peritoneum, provided the amounts introduced did not exceed that which the peritoneum could absorb or encapsulate, in about one hour's time. When the power of absorption of the peritoneum was impaired, no peritonitis resulted, but septicæmia, if the micro-organisms present could induce decomposition of the albuminous fluids. In like manner small quantities of the pyogenic micro-organisms, unless the injected fluid was chemically irritating, *i. e.*, could cauterize the peritoneal surfaces—produced no harm, unless the amount somewhat exceeded 10 c. c. m.

Suppurative peritonitis, however, was produced by these micro-organisms.

"(a). When stagnant fluid was present, capable of nourishing the micro-organisms (salt solution, bouillon), the bacteria developing more rapidly than the peritoneum could absorb them.

(b). When caustic solutions had prepared a field for the growth of the micro-organisms by destroying the surface of the peritoneum.



(c). Especially when a wound of the peritoneum was present—even the hypodermic puncture made in introducing the cultures may be the starting point of the peritonitis.”<sup>1</sup>

The bearing of these observations upon the subject we are now studying is manifest. Unless free drainage is afforded for all albuminous fluids, despite the exclusion of specific organisms, the presence of the ordinary innocent micrococci will initiate putrescent changes which will cause septicæmia (sapræmia?), provided the effusions exceed a small amount and the absorbent powers of the peritoneum are impaired. It is in the highest degree probable that this normal absorbing power of the peritoneum *will* be impaired by the shock of a severe injury, a prolonged operation, or the effects of both combined, under which circumstances unless free drainage is afforded, the effused albuminous fluids become “stagnant,” and if specific organisms be present, even in such small quantities as under other circumstances would be safe, suppurative peritonitis will occur, and with additional ease if a wounded surface be present. The lesson to be learnt from these observations is unmistakable and is confirmed by clinical experience, viz., that effacement of all wounded surfaces, *i. e.*, their coaptation by suture—and free drainage, even in the presence of dangerous numbers of pyogenic organisms, will avert disaster.

Practical application of the teachings of these experiments in explanation of the causation of the fatal results of gunshot wounds of the abdomen, and to the technique of laparotomy for the relief of such injuries, clearly indicates that all blood and serum must be primarily removed with the most scrupulous exactness; provision for free drainage for further effusions must be provided, unless there is a reasonable certainty that these will be poured out in such small amounts as to be innocuous; every wounded surface must be coaptated

<sup>1</sup>P. 120-124 ANNALS OF SURGERY, 1887, contain a résumé of these experiments, the original articles appearing in Statistischer und experimentell-pathologischer Beitrag zur Kenntniss der Peritonitis—Charité Annalen, XI. Jahrb., 770 and Langenbecks Archiv. f. klin. Chir., Bd. XX, I, p. 51. I am indebted to Dr. Curtis's article for my facts.

with all attainable accuracy by such sutures and suture-needles as will leave the smallest superficies of injured peritoneum; the drainage opening—if a tube be deemed necessary—must be most strictly guarded; that depression of the circulation present during shock<sup>1</sup>—either of injury or operation—must be removed by appropriate remedies; the vascularity of the peritoneum must be kept as near the norm as possible, to enable its absorbing function on the one hand to prevent suppurative peritonitis by permitting no collection of stagnant fluids to provide pabulum for any pyogenic bacteria which may have gained access to the cavity; on the other hand, septicæmia<sup>2</sup> induced by decomposition of the same stagnant albuminous fluids by the mere bacteria of putrefaction.

Having ascertained what experimental research teaches, I shall now endeavor to answer in order the questions propounded, and first, "What are the tendencies of the disease, are they towards recovery or death?"

Examination of the only statistics on a sufficiently large scale shows that a fraction under 8 % of recoveries follow after penetrating abdominal wounds; but of this number some doubtless sustained no visceral injuries, as I shall soon show is not uncommon; others, perhaps, there were, the walls or whose hollow viscera were penetrated obliquely; others again in whom the alimentary tract was wounded in those parts which possess an anatomical arrangement unfavorable to the extravasation of their contents.

Thus the walls of the stomach and duodenum are of such thickness that even when directly penetrated by a small ball there is but little chance of primary extravasation, while when their walls are traversed obliquely there is apparently no tend-

<sup>1</sup>The experiments of Goltz demonstrate that the abdominal viscera, including the peritoneum, are intensely congested in shock, and during prolonged abdominal operations we are all well acquainted with the increased vascularity of this membrane; in such a condition the power of absorption is greatly impaired and probably entirely lost, hence my advice.

<sup>2</sup>Certainly some, if not all of the so-called septicæmias are really sapræmias, *i. e.*, a disease produced by the absorption of ptomaines. When Wegner's observations were made, the subject of ptomaines was in its infancy, hence the term septicæmia instead of sapræmia.

ency at all towards primary escape of the visceral contents. The effects of the rate of speed of the ball, the obliquity of its track, and the anatomical disposition of parts is well illustrated by a case upon which I performed the first laparotomy for gun-shot wound done in Philadelphia. The first visceral wound was of the anterior wall of the stomach, and was so small and valvular as to require some manipulation with a director to determine that it was a penetration and not a contusion, neither gas nor fluids escaping on firm pressure on the organ.

The wound of exit was, of course, larger, yet still was water- and air-tight, but contrary to all expectation, the wound of entrance in the duodenum—and it must be remembered that there is no material difference in thickness of the walls of the duodenum and stomach—was much larger and more ragged than that of exit from the stomach, and freely permitted the escape of the duodenal contents. The actual conditions observed in my own case teach that while a single oblique wound under peculiarly favorable circumstances *may* not give rise to primary fæcal or perhaps even gaseous extravasation and cure result, yet multiple ball wounds of the gut must necessarily always *admit* of, and probably result in both primary and secondary effusion of the visceral contents, if life be sufficiently prolonged. A single oblique wound of the urinary bladder produced by a small ball may possibly behave in the same manner, but I think not, for anatomical and physiological reasons too manifest to require explanation. A wound of the gall-bladder would under any circumstances remain patent. In proof of my statement that the abdomen may be traversed by a ball without visceral injury, I need only refer to the four cases reported some years ago by our President and which I shall presently cite for another purpose. Vomiting of, and the passage of blood may result from simple contusion of the viscera; emphysema of the abdominal wall can readily occur without wound of the gut, while tympany in the hepatic region is often most fallacious as proof of a wounded intestine.

After penetrating abdominal wounds, as after every other

injury howsoever severe, there are conservative processes initiated, which occasionally succeed unaided by art, yet from an impartial consideration of the above facts, it appears that when visceral wounds undoubtedly exist, the *tendencies* of these injuries are invariably towards death, recoveries being so rare as to be regarded and reported as surgical curiosities.

The escape of the few is only the exception to the rule, which, instead of making against operation will, when the process of spontaneous recovery is carefully studied, serve as an additional incentive to laparotomy, since this study will show upon how slender a thread hangs the chance of recovery, and how readily this delicate filament may be strengthened almost to a cable by a skilfully performed operation.

What is the cause of death? Hemorrhage in itself is rarely fatal in any case where an opportunity is afforded for operation, but may occur to a dangerous extent; especially in the young or aged, and that too from vessels of a size to be rightly considered insignificant were they not situated in a closed cavity. A collection of blood amounting to only an ounce or two may be fraught with fatal consequences, either from the induction of sapræmia or because it furnishes pabulum for the development of the organisms productive of suppurative peritonitis.

Death, however, is due in nearly every case to septic peritonitis, caused by extravasated flatus, fæces, urine or bile—possibly also by fragments of soiled clothing, as in a case presently to be quoted. Of those attacked with peritonitis due to fæcal extravasation, over 90% die within 48 hours. The explanation of some exceptional recoveries is, that the free abdominal wounds resulting from large balls have afforded such effectual drainage for the escaping fæces that they have not become diffused throughout the abdominal cavity, while any resulting inflammatory products have likewise readily escaped. I have also already shown that the peritoneum can safely dispose of a limited amount both of fæces and flatus.

When recovery ensues what conservative processes occur? The effused gas or fluids are absorbed without producing either serious local trouble or systemic infection, and a limited adhesive inflammation results, just sufficient to glue the injured

organ to the abdominal wall or a neighboring viscus. It is possible that a wounded liver, kidney or spleen may heal without adhesion of the wounded organ to the nearest peritoneal surface, but I am unacquainted with any observations bearing upon these points.

Doubtless in some cases adhesions do form, shutting off for a time amounts of poisonous material beyond the capacity of the peritoneum to absorb either in time to prevent suppurative peritonitis or with safety to the organism, but owing to the septic character of the inflammation, the adhesions break down and death results. Bearing this in mind, the apparent answer of statistics as to the actual frequency with which conservative processes occur is probably far below the actuality, but so far as the permanency of adhesions and the safe absorption of deleterious matters goes, roughly speaking, these processes are successful in 8% of the cases.<sup>1</sup> Among the rarest of events in those who recover is the safe evacuation by abscess of the abdominal walls of a small primary faecal extravasation which has become limited by healthy adhesive inflammation, and the same event happening as the consequence of a secondary extravasation taking place among preformed firm adhesions. Far more commonly these so-called faecal abscesses burst into the peritoneal cavity and rapidly cause death in cases which, for a time, bade fair to recover.

What favors or prevents these conservative processes? The absence or slight extent of flatulent, faecal, urinary or biliary extravasation;<sup>2</sup> the absence or slight amount of effused blood or serum, *i. e.*, stagnant albuminous fluids in the abdominal cavity; a favorable relation of the wounds with reference to the neighboring viscera or the abdominal wall providing for free drainage in the exceptional cases just mentioned; valvular wounds; above all, an aseptic condition of the peritoneal surface of the wounds and their immediate environment, since without this no reliable, limited adhesive inflammation can oc-

<sup>1</sup> Granting the diagnosis always correct; but in some of these recoveries probably neither abdominal nor visceral penetration existed.

<sup>2</sup> See results of experiments already quoted for truth of these and following statements.

cur; and partial or complete arrest of intestinal paralysis, *i. e.*, rest—admitting of the most perfect permanent coaptation of wounded serous surfaces which is feasible; all favor the conservative processes, while the reverse prevents them. Just here it must not be practically overlooked, although the theoretical belief is held by us all, that ball wounds of the abdomen and hollow viscera differ pathologically in many essential particulars from punctured or incised wounds. In the former more or less death of tissue must follow, from which results of necessity an unhealthy inflammation which usually becomes generalized; plugging of the wound by the everted mucous membrane is very unlikely; and effectual coaptation of neighboring serous surfaces, either of the wound or contiguous parts, can rarely occur; in consequence of all these circumstances, natural repair is very rarely permanent. Again, the edges of an incised wound of the mesentery are unlikely to slough, while the track produced by a ball infallibly will, and the dead tissue not being evacuable by the gut, as in a wound of the intestine, will produce fatal results, as has been already reported.

What has been already said sufficiently answers—and that in the negative—the question relative to the reliability of nature's methods as compared with those of art, and the advisability of imitating them. Even the good to be effected by arrest or diminution of normal peristalsis after laparotomy is doubtful, for, having effectually closed all wounds, any adhesion of neighboring organs is unnecessary, and, as a possible source of future trouble, is to be avoided.<sup>1</sup>

The only question now left to answer is, what are the dangers inherent to laparotomy and what advantages does it offer? Shock—due in these cases to prolonged irritation of the abdominal sympathetic—and the risk of rendering a peritonitis septic and diffused, when it might have remained local and simple, are the special dangers of the operation; but, as we have it in our power to prevent a generalized peritonitis from

<sup>1</sup> The danger of old or even recent peritoneal bands is too well known to need proof. This view will be productive of good by doing away with one of the chief indications for the enormous doses of opium too often administered in traumatic peritonitis (Parke's also).



being originated by our manipulations, and to render the inflammation necessarily resulting from the accident comparatively innocuous, shock is all we need dread.

The advantages of operation are manifold. Thus, we can either forestall septic peritonitis or reduce its dangers to a minimum; we can prevent sapræmia—a common cause of death, as I believe—due to the absorption of ptomaines, or perhaps fibrin-ferment; should peritonitis have set in, we can afford efficient drainage for the effusions which may in themselves be already poisonous, or, as we have shown, will assuredly become the chief source of danger; we can substitute for adhesions of doubtful permanency certain methods which secure the escape of the injured portions of gut into the lumen of the bowel; we can prevent the fatal results which must follow the casting off of a decomposing slough of a wounded portion of omentum or mesentery into the general peritoneal cavity; we can arrest hemorrhage, which from its amount will prove fatal, or from its decomposition will equally produce lethal results; we can restore the continuity of the gut, if it be nearly or completely severed, the former condition being not uncommon; we can avoid the risk of fæcal fistula, which, had it occurred in my patient, would soon have destroyed life by inanition; and we can remove a hopelessly damaged kidney or spleen, and repair a wounded pancreas or liver.

If then my facts and the deductions drawn from them be true, all ball-wounds of the abdomen involving the intestines, stomach, bile or urinary bladder, should be treated by suture or resection and suture, injured omentum should always be excised and the wounded serous surfaces carefully sutured, wounds of the liver and pancreas treated as I shall presently state, and a wounded spleen or kidney extirpated; provided certain contra-indications, yet to be pointed out, do not exist.

But, it has been urged, every symptom except the escape of fæces, flatus, urine or bile from the external wound, has been demonstrated to be fallacious as a proof of visceral implication, and that the abdomen has been traversed from side to side without any of its contents being wounded. Granted: but listen to the abstracts of the histories of four cases re-

ported by our president, and ask yourselves the question, "could these casts have done worse than die, and would not they all have had a fair chance of recovery had the ball, effused blood, cloth, etc., been removed, a careful toilet of the peritoneum made, and effectual drainage instituted?" By the light afforded both by the investigations I have quoted, and clinical experience, but one answer can be given, and that an affirmative one.

A round ball, after travelling beneath the skin for some distance, penetrated the abdomen at the linea alba, passed downward, backward and to the left, lodging near the iliac bone. No wound or contusion of the bowels could be discovered after death on the third day, but a piece of cloth, lymph and three pints of reddish serum were found in the abdominal cavity. A conoidal pistol-ball entered obliquely to the right of the umbilicus, tore the parietal peritoneum, and emerged five inches below and to the left of the umbilicus. After death on the third day, no visceral injury was found, but lymph and a large quantity of bloody serum. A soldier "was wounded by a ball from a shrapnel shell which passed through the cavity of the belly and lodged in the muscles of the back;" another "was wounded by a minié bullet, which passed obliquely through the wall, entered the cavity for several inches, and then escaped through the anterior wall of the belly." The autopsies of these cases, like those of the two former, showed "peritonitis and the presence of large quantities of acrid bloody serum in the abdominal cavity," a combination of all the conditions experimentally proven to be most fatal; *i. e.*, diminished power of absorption, acrid fluids, stagnating fluids and wounded peritoneal surfaces, needing no injury of bowel, bladder or other viscus to destroy life.

It therefore follows that even penetrating abdominal wounds without involvement of viscera, are better treated by exploratory section than by the expectant plan of treatment, provided the operation be done with due care. Moreover, in many instances unsuspected injuries of blood vessels, contusions of bowel, of omentum or of the viscera, which will later on slough, will often thus be detected and appropriate treatment instituted.

The import of the last few sentences renders it hardly necessary to state that I lay little stress upon the diagnostic signs which are said to be indicative of wounds of the intestines or other viscera, since I believe the diagnosis should be made by the eye alone, *i. e.*, the track of the ball should be carefully enlarged with full aseptic precautions until it is decided whether the peritoneum has been penetrated or not, and if a perforation be found, a median section should be immediately done to ascertain the existence of, and to repair any further damage. Although apparently heroic, this advice is really conservative, since all the rational symptoms of peritoneal penetration and visceral injury have proved fallacious, and if there be no peritoneal wound, what harm can result from the careful aseptic enlargement of the track of a ball wound involving only the abdominal walls? What I have just said is only strictly applicable when the wound of entrance or exit implicates the anterior or lateral portion of the abdomen, for when the ball penetrates its posterior wall, or has first passed through the thoracic or pelvic parietes, it will be inadmissible to determine the fact of peritoneal penetration by direct exploration of the wound or wounds, and the rational signs of penetration will have to be relied upon. Under these circumstances a correct opinion is always most difficult and oftentimes impossible without laparotomy.

I shall only dwell in the briefest manner upon the rational signs of peritoneal and visceral injury, since they will rarely be needed to determine the advisability of operation, and others, notably Bryant, of New York, have treated most admirably of this part of the subject. Of course, the escape of bile, fæces, urine or the contents of the stomach at once settles both the question of peritoneal and visceral penetration, but these signs are rare even after numerous visceral wounds produced by the small modern balls which commonly cause the gunshot injuries of civil life. Repeated vomiting of considerable quantities of blood almost certainly indicates peritoneal and visceral penetration, although this symptom may be due to contusion, and is unlikely to be present even with numerous wounds unless one involved the stomach, duode-

num or, perhaps, the jejunum high up; while, of course, in uncomplicated hepatic, pancreatic, renal, splenic, mesenteric, omental and vascular traumatisms, it is absent. The passage of blood in quantity per anum is also strong presumptive proof, but it so rarely occurs early in the case as to be of little practical diagnostic value for operative purposes.

The presence in the abdomen, within an hour or two of the injury, of a sufficient bulk of fluid to be detectable by physical exploration positively indicates peritoneal penetration, and probably visceral injury, since only intra-abdominal hemorrhage could produce such a rapid accumulation. Some such cases have, I believe, been reported. The rapid supervention of general peritoneal tympany, *i. e.*, an accumulation of intestinal gas in the general peritoneal cavity—is a certain sign of wound both of peritoneum and gut, but to be of any great value it must supervene within a very short time of the injury. So far as I can ascertain it has not yet been noted previous to abdominal sections for ball wounds. Finally, an amount of hemorrhage which can neither be accounted for nor arrested after a careful examination of the parietal wounds, almost certainly indicates penetration and vascular or visceral injury.

It will be noticed that I have omitted many symptoms usually given, but they have proved so utterly fallacious in many instances as to be unworthy of the name of diagnostic signs. Shock preeminently belongs to this category.

If we exclude those rare cases where there is only a wound of entrance in an unusual site, for instance, the posterior lumbar region, I feel that it is a far graver question to decide when not to operate than when to operate. I shall only tentatively point out the contraindications, for I consider that laparotomy for ball wounds is of too recent date for anything beyond provisional indications and contraindications.

Profound shock, provided it be not mainly due to a loss of blood which can probably be rapidly arrested after the abdomen is opened, is an undoubted contraindication. If the greater part of the shock be not due to hæmorrhage, the prolonged handling of the bowels, especially in the young or old, is apt, through irritation of the abdominal sympathetic, to pro-

duce a dangerous amount of prostration in those whose vital powers have been already depressed by the injury. Such an effusion of blood escaping externally, internally, or in both directions, as would render it probable that the added shock of an operation would terminate life before, or in spite of the arrest of hæmorrhage, contraindicates laparotomy. As I cannot conceive of any circumstances where at least a perfectly clean abdominal wall, hands and instruments are unattainable, with some germicide such as mercuric bichloride, iodoform, subiodide of bismuth, tincture of iodine or carbolic acid, with at least one tolerably competent assistant, the surroundings of a patient should never contraindicate operation in an appropriate case, provided the operator be experienced in abdominal surgery; for I cannot think that the average practitioner should attempt a laparotomy for gunshot wound. An operation demanding so much care, experience and attention to detail, can rarely be properly performed by a tyro, i. e. every traumatism discovered and repaired—without undue loss of time and unnecessary handling of the viscera. If possible, only one pair of hands should be introduced into the abdominal cavity, and those the operator's; so that I contend that inexperience approaches very closely to a positive contraindication.

When a skilled operator cannot be secured, in exceptionally favorable cases the attempt may be made and succeed, but most cases will do better left to nature than operated on by a bungling surgeon, who from the nervousness induced by inexperience will, in his hurry, overlook wounds or some of the essential details of aseptic abdominal surgery. In support of my statement, that experience is requisite for this operation, I would ask you to reflect, how much more difficult it is to open an abdomen with tense and rigid walls, take out, examine and replace twenty odd feet of intestines and critically inspect all the abdominal organs, than it is to remove a large ovarian tumor which leaves the parietes lax, thus giving abundance of space.

If, because the patient has been seen too late, a generalized, well-advanced peritonitis exists, laparotomy is strongly contra-

indicated, for, since the main aim of the operation is to *prevent* diffused, unhealthy peritonitis, no indication for its performance any longer exists. It is true that abdominal section has been advocated and successfully performed for acute peritonitis, but I do not think it will do aught but harm in cases following gunshot wounds of the abdomen with visceral injury; possibly where no visceral complications exist, it may prove occasionally useful. If it was possible to determine beforehand that only one perforation existed, a laparotomy might be done, and, provided the injured loop of bowel could be found and secured in the abdominal wound and free drainage instituted, good might accrue; but my experience of laparotomy after diffused peritonitis following rupture of the intestines and for ball-wounds, teaches me that it is extremely improbable that we should be able to find the wounded bowel without excessively prolonged manipulation; that the gut would be in no condition to suture; that multiple perforations would be so situated that all the loops of injured intestine could not be secured in the abdominal wound—and if all cannot be thus held so as to discharge their contents externally, what good can the operation do?—and finally that neither free drainage nor an effectual toilet of the peritoneum can be secured. Wounds of the solid viscera will, according to their ascertained or probable severity, serve as contraindications or the reverse.

With reference to the proper time for operation I can only say that both experience and experiment seem imperatively to demand that laparotomy should be done at the earliest possible moment the condition of the patient will warrant it. Shock—which is usually not well marked—is all that should withhold us, and not even this, if hæmorrhage is producing the condition, in which case, as in other severe injuries, the operation must be at once proceeded with, despite the unfavorable condition of the patient, lack of proper assistance, preparations, etc.<sup>1</sup> It is only under such desperate circumstances—and they can but rarely obtain—that we are warranted in operating without having most scrupulously provided for every contingency;

<sup>1</sup> Shock arises in most instances of ball-injury, from severe hæmorrhage, at least this is my opinion.



for it must be borne in mind that after opening the abdomen, serious hæmorrhage may be found arising from the liver, kidney, pancreas or spleen, that resections of portions of intestine may be necessary, and I can readily conceive that before long we shall find reports where the splenic or a renal artery has been wounded demanding removal of the organ whose blood supply will be cut off by the ligature of its nutrient artery.<sup>1</sup> Present experience seems to demand the adoption of the following precautions. I shall first indicate what should be provided when obtainable, afterwards detailing what substitutes can be used in emergencies: First, all pubic or other hair must be shaved off, the skin of the abdomen, especially that of the umbilical depressions, thoroughly cleansed by the free application with a nail-brush, of turpentine 2 parts, alcohol 14 parts, which must then be thoroughly removed with the nail-brush, soap and warm water, and a cloth soaked in mercuric bichloride solution laid over the abdomen while the patient is being etherized; indeed, when circumstances will admit, all the cleansing had better be done before etherization. Washing the parts with ether, alcohol, antiseptic, or plain soap and water and the application of a cloth wet with carbolic acid solution, thymol, salicylic or boracic acid solutions, or a very weak iodine tincture solution, will do in an emergency. Abundance of freshly distilled recently boiled water should be at hand, some kept hot, some cold, with a large fountain syringe for flushing the abdominal cavity. This water can be usually readily obtained from the condensed steam collectable from the steam-heating apparatus of most hospitals, needing nothing but filtration and boiling to insure its sterility. If this is not obtainable, one part of mercuric bichloride to ten thousand of water, one part of carbolic acid to five hundred of water, or larger proportions of water, may be used, the water boiled, allowed to settle and decanted for use. I look upon the addition of these germicides simply as insur-

<sup>1</sup> Some two weeks after penning these lines, I was informed that one of our fellows, Dr. W. W. Keen, had been compelled to remove the left kidney on account of the uncontrollable hæmorrhage following a ball-wound.

ing the sterility of the water, not that they are to kill germs already present in the abdomen, or which gain access to it during the operation; none of these should be allowed to enter, and any that do, must be mechanically removed by a proper toilet, and above all by the free flushing of the cavity with this sterilized water. Used thus I believe germicides do good, but in anything like full strength, I look upon them as only harmful.

In like manner, the sponges, towels and instruments should be first carefully cleansed with soap and water—to which carbolic acid may be added, if desired—and then placed in the hot sterilized water. Special attention should be paid to the cleansing of the handles of instruments, which if roughened must be thoroughly scrubbed with the nail-brush. The operator's and assistant's hands and finger nails should be most scrupulously cleansed with the nail-brush, etc., and the sterilized water, or an antiseptic solution. Six aseptic sponges should be provided, three of which should be on handles or held by sponge-holders. When soiled, they should be first cleansed in one vessel, and then rinsed out in fresh water before being used again. A number of soft old linen or flannel cloths should be handy, lying in the hot sterilized water, to envelope the intestines in. I would suggest that as few instruments as possible be used, viz., one scalpel, a probe-pointed knife, a director, one tenaculum, one aneurism needle, two fine sewing needles threaded with fine pure silk, another coarser, and threaded with dry aseptic gut, two ordinary surgical needles threaded with heavy silk, half a dozen hæmostatic forceps, a thermo-cautery, one pair of scissors, and abundance of silk and catgut ligatures, all kept beneath the sterilized water, or in a carbolized solution, according to the surgeon's preference. Whenever the instruments or sponges are not in use, they should either be rinsed off and then placed in the sterilized water, or laid upon a clean towel wrung out in the same. Every instrument, needle, sponge and cloth, must be counted *before* and *after* the operation. A small quantity of either iodoform gauze, or plain gauze with its meshes filled with the powder of this drug must be at hand to tampon a wounded liver, spleen or kidney.

As a dressing, my personal preference is the free application of iodoform to the line of the wound, and dry absorbent cotton with a snug flannel binder; but corrosive gauze, subiodide of bismuth, carbolized gauze, eucalyptol, etc., with broad rubber adhesive straps should be provided, according to each one's liking or custom, with such additional instruments as may be deemed necessary. If drainage be used, a glass-tube is the most desirable form to employ, but if not obtainable, a large *non-perforated* rubber one can be substituted. A hypodermic syringe, with solution of atropia, whiskey, hot water-bags, bottles or bricks, must also be ready for instant use.

Now as to technique. The patient's limbs and trunk must be carefully wrapped in blankets, with towels wrung out of the aseptic or antiseptic solution, tucked under and folded over them around the abdomen to prevent any accidental contamination of the peritoneal cavity. If not previously done, the urine should now be drawn off, lest from a bladder wound the fluid become forced throughout the abdominal cavity by the patient's struggles. Ether should be most cautiously administered.

The incision should always be median, as otherwise it is almost impossible to gain a proper view of the parts,<sup>1</sup> and should usually extend from a short distance above the umbilicus to about two inches above the pubes. The abdomen having been opened, any clots or blood which obscure the operating field may be removed, but otherwise, unless it is manifest that severe hæmorrhage is going on, the small intestines, which usually first present, should be carefully gone over, inch by inch, from the stomach to the ileo-cæcal valve, keeping them constantly enveloped in towels wrung out of hot water; afterwards the stomach, spleen, liver, pancreas, large bowel, kidneys, bladder, omentum, mesentery, and abdominal vessels must be examined. I do not mean that if various wounds are discovered—say in the small intestine—and the place of exit of the ball

<sup>1</sup> Neglect of this rule has proved disastrous in more than one instance.

See Dr J. H. Packard's case, *Med. News*. March 26, 1887, pp. 339 to 341, where after the toilet had been commenced free bleeding was discovered necessitating a search deep in the pelvis to find a wounded iliac vein.

from the abdominal cavity, all in such relations as would absolutely exclude injury of the stomach, liver, kidneys, spleen or bladder, that such a detailed examination should be made—far from it—for every unnecessary manipulation is injurious; but I do advise that, rather than overlook a wound, much manipulation which the result proves to have been unnecessary, had better be made. Of course, the source of a severe hæmorrhage must be at once sought for, and any wounds of the hollow viscera ignored for the time being, care however being taken that the general peritoneal cavity is protected from fæcal extravasation by removing the intestines outside the abdomen, keeping them wrapped in warm, moist cloths: such hæmorrhage is, however most unusual. Whatever plan is pursued, let everything be done methodically, and each injury repaired as it is detected, as this saves much time, and renders any oversight almost impossible. All wounds of the bowel, however trivial, should be minutely cleansed, coaptated by the Lembert suture of fine silk introduced with an ordinary sewing needle<sup>1</sup> and the suture-line rubbed over with a little iodoform.<sup>2</sup> When necessary from the size or number of the wounds a portion or the whole calibre of the gut must be exsected.

Wounds of the liver, if situated at the free border of the organ, should if possible be coaptated with dry aseptic gut which will soon swell and fill the track made by the needles. If this cannot be done, the hæmorrhage may perhaps be arrested by the judicious use of the thermo-cautery, but if the bleeding be free, the wound should be plugged with an iodoform gauze tampon which is to remain permanently, or may perhaps be carefully removed at the close of the operation, when, if the bleeding be almost entirely checked, the cautery may then be used as a

<sup>1</sup> This is to secure as small a wounded surface of peritoneum as possible since the needle-track will be filled by the thread; the importance of this is clear by the light of the experiments quoted. In addition, Dr. J. H. Packard calls attention to the troublesome bleeding resulting from wounds of small vessels by the ordinary suture needle.

<sup>2</sup> Dr. W. T. Bull, the most successful operator for ball-injuries has always used this method of dressing.

Recommended by Senn, of Milwaukee, I believe.

further precaution—if the flow be free, the tampon must be replaced and allowed to remain permanently.

Wounds of the pancreas, spleen, or kidneys, must be treated in a similar manner, or if these measures fail, either spleen or kidney must be excised. Since a wounded splenic artery would inevitably result in gangrene of the organ, it must be removed. The same advice holds good for wound of a renal artery, but in these cases death from hæmorrhage will usually result before art can intervene; still, such possible complications must be provided for. Wounds of the bladder had better be sewed with dry chromic and sulphurous acid gut which by its swelling will fill the track of the little wounds, and the needle used should be a round one, as small as can be made to carry the thread. Contused bowel will almost certainly slough, so that the injured portion had better be excised and the healthy peritoneal surfaces united by suture.<sup>1</sup> Wounded or contused omentum or mesentery must also be excised, and the edges carefully united by interrupted sutures. The experience of at least one case has shown, that since an omental slough cannot be eliminated into the lumen of the bowel as occurs in wounds of the intestine, a fatal generalized peritonitis will result from the local gangrene of the injured part. All bleeding must be checked even from the smallest vessels, for quite extensive oozing will occur from most insignificant vascular orifices because they are situated in a closed cavity, and although the amount lost may not be dangerous *per se*, it will prove so as a source of septicæmia or peritonitis.

If a segment of bowel is to be excised, the cuts should be made at such points as correspond to the distribution of a large mesenteric branch, in order to secure a due blood-supply to the edges of the incisions, and the parts to be removed should be laid upon a large, flat sponge, or folded napkins to prevent faecal extravasation into the abdominal cavity. To obviate kinking of the bowel, a V-shaped piece of the mesentery must

<sup>1</sup> Parkes contends that the peritoneum can be safely united over the contused spot with a continuous catgut suture, except where the injury involves the mesenteric attachment, when it must be excised.

be removed, the branches of the V not corresponding to the cut edges of the bowel, but presenting a free margin of an eighth of an inch lest want of vascularity cause failure of union at this, the most doubtful point. After arresting hæmorrhage, the mesenteric wound must be carefully coaptated by numerous points of interrupted suture. Now the bowel should be united by the Lembert suture, turning in at least one-fourth of an inch of the serous coat, or by the Czerny-Lembert, Gus-senbauer or other suture, whichever is preferred, although the Lembert, with sufficient inversion of serous coat, is thoroughly reliable.

The first stitches must be placed at the mesenteric border, are the hardest to make efficient, and should be three in number to secure perfect contact of the serous surfaces, as Parkes observes. One stitch directly opposite the mesentery, and a third and fourth equidistant between the first two should then be passed, after which the intermediate ones can be inserted about one-eighth of an inch apart, first carefully inverting the mucous membrane. For special details and numerous ingenious devices I must refer you to the admirable experimental paper of Parkes and the writings of Treves, Ashhurst and others.

Should the pulse fail at any time during the operation, owing to irritation and paresis of the abdominal sympathetic; flushing the intestines and peritoneal cavity with hot water will oftentimes at once remove the unfavorable condition. The most scrupulous care must be exercised in the peritoneal toilet, which can be most quickly and effectively made by thorough irrigation of the cavity with warm sterilized water<sup>1</sup> and subsequent careful removal of all fluid in the ordinary manner by sponges, especial attention being paid to the cavity of the pelvis, and the renal regions.

When possible, the peritoneum should be carefully united over the orifices of entrance and exit of the ball, just as in the case of intestinal wounds, and a little iodoform rubbed in.<sup>2</sup>

<sup>1</sup> Sterilized either by being distilled and boiled, or by adding minute quantities of some antiseptic.

<sup>2</sup> If the puncture made by the hypodermic needle in experimentation was the starting point of a peritonitis, much more will the wounds be made by a ball. I think this matter has been too completely ignored



Closure of the abdominal wound should be effected by first carefully suturing the peritoneum with fine silk or catgut. This I look upon as most important, since the tenseness of the abdominal walls, so different from the conditions existing after the removal of a tumor, render it extremely difficult to bring the peritoneal surfaces into proper apposition without undue traction on the sutures, thus possibly leaving raw surfaces which may serve as the starting-point of a peritonitis, while, even if not provocative of such serious consequences, a ventral hernia will almost certainly result.

The muscular, aponeurotic and cutaneous structures should then be carefully coaptated by stout silk sutures, iodoform be freely dusted along the wound, which may be supported by one or more broad rubber adhesive strips, if thought desirable, when a thick layer of absorbent cotton and a flannel binder will complete the dressing. The patient should now be placed in his previously heated bed, with limbs flexed over a pillow,<sup>1</sup> the urine drawn, external warmth applied, and stimulants, such as atropia or whiskey given hypodermically, if they are indicated. If not, a moderate hypodermic of morphia must be administered combined with a small dose of atropia and rest enforced.<sup>2</sup>

When incipient peritonitis exists at the time of operation, with the probable formation of large quantities of acrid, septicæmic or sapræmic inducing serum, drainage should in all cases be instituted, for some patients have, I think, perished for want of this precaution.<sup>3</sup> The tube, preferably of glass, should have its end kept well down between the rectum and bladder in the male, or in Douglass' cul-de-sac in the female, with the external orifice plugged with iodoform cotton.

The after treatment will be considered under three different heads, viz. :—

1. When peritonitis does not exist at the time of operation, in other words, when a primary operation has been performed.

<sup>1</sup> When purulent peritonitis exists, a lateral decubitus is perhaps advisable.

<sup>2</sup> I can conceive of cases where transfusion, or the temporary use of Esmarch's bandages to the limbs might be indicated, where death is imminent from severe hæmorrhage.

<sup>3</sup> Some of Parkes' experiments exemplify this point.

2. When incipient peritonitis does exist at the time of operation, *i. e.*, when a secondary operation has been done; and—

3. When, despite all our efforts, or due to some neglect in technique, peritonitis develops after operation.

1. Under the first conditions, a recumbent position, with flexed knees, seldom changed—and then not by the patient's efforts—should be insisted upon. Alimentation must be carried on by the rectum entirely, when possible, for at least forty-eight hours, and in some cases even longer, when the stomach is irritable. At the most, cracked ice and small quantities of beef peptonoids should be given when the rectum rejects enemata, or when feeding by the mouth is begun. The higher up the intestinal canal the wounds are, the more imperative the rectal feeding becomes. At the end of a few days, larger quantities of food may be given. Should tympany occur to any extent, the rectal tube and the enemata should be tried. If masses of *fæces* are present, or suspected to be lodged in the colon, about thirty to sixty grains of inspissated ox-gall dissolved in some mucilaginous vehicle should form the enema, and will sometimes relieve severe tympanites where an ordinary injection will fail, owing to occlusion of the gut by *fæcal* plugging.

2. When a pre-existent incipient peritonitis has necessitated drainage, the tube should be periodically emptied by a syringe with a soft-rubber tube attached, the syringe kept aseptic, and tube corked with iodoform cotton. Should the discharge become large or purulent, one careful irrigation with weak mercuric bichloride solution, followed up with boracic or salicylic acid solution, should be resorted to. With a large amount of discharge, a lateral or semi-prone position, which will favor drainage, is advisable when the patient can assume either attitude.

Neither much food nor alcoholic stimulants will be needed even in this condition, since either the patient will die before true exhaustion demanding large quantities of aliment and alcohol comes on, or recovery will ensue. As will presently

be explained, atropia is better than alcohol for the shock of commencing peritonitis, or the "exhaustion" of the latter stages, *i. e.*, the depression of the nerve centres, especially those of circulation and respiration.

3. When peritonitis develops after the operation, our initial treatment must depend on whether the disease comes on gradually or suddenly. When the latter occurs, there is at times decided evidence of shock from vasomotor paresis, evidenced by an apathetic semi-conscious condition, with extended limbs, pinched features, and a weak pulse—in such a condition opium in large doses will probably prove fatal, while *small* doses of morphia with atropia will relieve pain and stimulate the heart. The heart itself always should be examined by auscultation, since this may demonstrate that its action is really feeble, while the pulse feels hard and wiry. Now, under such circumstances the pain is often severe, but large doses of opium, unless combined with atropia or digitalis, are very dangerous. I say large doses, meaning by this term those ordinarily recommended for peritonitis in the textbooks.

Later on, owing to asthenia, the recumbent position, and the compression of the lungs by tympanites, hypostatic pneumonia is apt to develop, when the improperly aerated blood tends to paralyze the respiratory centres. Here morphia must be very cautiously given, or better, in many cases withheld, and when given at all must be guarded by ammonia, atropia or digitalis. Stimulating hypodermic injections and revulsives, such as dry cups to the chest, are indicated. Where peritonitis develops gradually, opium can be given more freely, remembering that the ideal condition to be obtained by opium is freedom from pain, irrespective of the quantity of opium exhibited; and when this is secured a patient falls asleep, *but can be readily aroused*.<sup>1</sup>

This last sentence is the keynote of the opium treatment. Morphia had better be the drug employed, and should be given hypodermically, since opium by the mouth is not always absorbed, and may lie unchanged in the stomach or intestines

<sup>1</sup>Burchard, New York Medical Journal, August 15, 1885, *op. cit.*

for days to be suddenly taken up in fatal quantity. "In the later stages of peritonitis, especially when the heart and lungs fail, and when gastric regurgitations and hiccough are rapidly exhausting the patient's vitality, one or more hypodermics of atropia, varying in strength from one-sixtieth to one-tenth of a grain each, either alone or in combination with morphine, digitaline, ammonia or alcohol," according to indication, will at times save an otherwise hopeless case.

In addition, we undoubtedly possess two powerful means of directly affecting the vascular processes involved in a peritonitis. Free leeching done at the commencement of the attack, or when it has not progressed far, is of signal benefit, provided the patient has not lost much blood from the accident. This I have witnessed at the bedside of patients, and also experimentally proved, as may be gathered from my observations on blood-letting read before this Association three years ago. Cold, by means of the ice-coil to the abdomen, is a second means of controlling peritonitis. Cold applied to a peripheral sensory nerve has been shown by physiological experiment to control the afflux of blood to those parts supplied by the vaso-motor nerves which inosculate with such sensory branches. In the present instance, the nervous circuit consists of the lumbar nerves, supplying sensory filaments to the abdominal parietes, and the branches of the solar plexus which are distributed to the intestines and peritoneum. Cold applied to the former nerves, *i. e.*, to the abdominal wall, will therefore cause contraction of the blood-vessels of the peritoneum and intestines. It will do more; for it lowers the temperature, relieves tympany and calms the nervous system.<sup>1</sup>

Should the sutures uniting a resected or wounded bowel have given way, nothing remains but reopening the wound, irrigating the cavity with an antiseptic solution, and the attempt to secure the bowel in the abdominal wound—in other words, form an artificial anus; but practically this question will hardly arise.

<sup>1</sup>Leiter's block-tin coil is, of course, the best means for applying cold, but a few yards of half-inch rubber tubing kept coiled up by means of three equi-distant narrow strips of tin so interwoven with the tubing as to keep the coil flat, will prove nearly as effectual and can always be obtained in an emergency.

Should persistent and rising temperature, despite the ice-coil etc., be present without the local signs of peritonitis,<sup>1</sup> I should suspect the presence of some fluids which, generating ptomaines, were being absorbed and producing sapræmia. In such an event, the reopening of one angle of the wound, free irrigation of the abdominal cavity with safe antiseptic fluids, and the retention of a drainage tube managed as I have already directed, would perhaps save some otherwise condemned patients. In the same way, should septic peritonitis arise, with probable effusion of large quantities of fluid, such as are often found after death, I should strongly advocate a similar plan of treatment. Owing to the anatomical position of the kidneys, they are liable to become involved when the peritoneum is inflamed: hence, the use of turpentine is to be deprecated. Burchard states that "more than once has the timely application of cups and a digitalis poultice over the kidneys saved" for him, "the life of a patient who was insidiously developing a nephritis." Daily examinations of the urine should therefore be made, since retention of the urinary excreta in nephritis is a well known cause of peritonitis. Digitalis in some forms, and perhaps other diuretics, are also peculiarly indicated in the sapræmic condition, to aid in the evacuation of the poisonous ptomaines, for if none of these products are allowed to remain in the abdominal cavity, and those already absorbed can be eliminated, recovery will often ensue. I can hardly conceive as I have already said, of a case of this variety of traumatic peritonitis living sufficiently long to develop enough true exhaustion to demand large quantities of food and stimulants; but should this occur, of course the experiment must be tried, although the stomach will probably rebel.

In conclusion I wish to repeat that everything advanced must be viewed as more or less provisional, since sufficient experience of the operative treatment of these cases has not yet accumulated to warrant positive statements.

<sup>1</sup> Provided no symptoms of shock were present such as I have already described as ushering in a sudden attack of peritonitis.

# CONTRIBUTIONS TO INTESTINAL AND ANAL SURGERY.<sup>1</sup>

INGUINAL COLOTOMY—EXCISION OF HEMORRHOIDS—EXCISION OF FISTULÆ IN ANO—NEW OPERATION FOR CURE OF PROLAPSUS ANI.

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**I**NGUINAL COLOTOMY.—It is a well known fact that in the operation of colotomy, inguinal as well as lumbar, in which merely a lateral opening in the gut has been made, the contents of the latter will, as a rule, escape to some extent into the intestine below the wound, and, being forced upward by antiperistaltic action, will prolong and render difficult the process of defecation. I must confess that in nearly all of my cases of colotomy which were performed according to this method the result in regard to this point had been unsatisfactory until I adopted Madelung's plan of cutting across the entire gut, closing the end of the lower portion, and stitching the upper end into the abdominal wound. The result was perfect, so far as concerned defecation; the patient passed fæces once or twice a day in a short period of time, and was free from all annoyance during the rest of the day. From reading a discussion that took place at the Paris Société de Chirurgie, my attention was called to the possibility of danger eventually arising from retention in the closed portion of gut above the point of stricture, and I have therefore adopted in my last three cases Verneuil's plan of forming a spur, and thus securing the complete evacuation of the fæces through the artificial anus, while at the same time the interior of the lower portion of the gut remained accessible. The technique of the inguinal operation is as follows: Under strict antiseptic-

<sup>1</sup>Communicated to the New York Surgical Society, January 12 and 26, 1887.



tic precautions an incision is made parallel with Poupart's ligament and about three centimeters above its outer third. The peritonæum is opened to the extent of not more than three or four centimeters, a loop of the colon, in the region of the sigmoid flexure, is brought into the wound, and a needle armed with a coarse catgut ligature is passed under the gut at the point of attachment of the mesentery; the ligature is not tied, but serves merely as a handle. A spur is then formed by passing through a part of the intestinal wall on both sides of the mesentery a fine needle threaded with iodoform catgut, the line of stitches being about equal to the thickness of the abdominal wall, or perhaps a little larger. Then by similar sutures the opposed parietal and visceral peritoneal surfaces are brought in contact, so that the peritoneal cavity is entirely shut off from the wound, and the loop of intestine, so far as its peritoneal surfaces had been approximated by stitches, is secured above the level of the parietal peritonæum. The gut is then opened by an incision extending in a transverse direction toward the attachment of the mesentery, the edges being united to the integument by a few sutures of silk-worm gut. Some iodoform gauze is introduced into the peritoneal space at each angle of the wound; this promotes good drainage during the first twenty-four hours. The wound is dressed with vaseline and iodoform powder. I have performed this operation three times, the three operations occurring at the German Hospital within a period of fourteen days. Two of the patients had inoperable cancer of the rectum, the third an extensive syphilitic stricture. Recovery followed rapidly in each instance without any unfavorable symptoms, and the final result is so satisfactory that I feel justified in recommending this method.

I now present two of the patients to the society. In one of them you observe that there is a slight prolapse of the mucous membrane, which the patient attributes to the fact that to-day she did not properly adjust the elastic belt which retains a pad of cotton against the opening. These patients, as well as the third, who could not be present, discharge their feces through the artificial anus. Defecation occurs once or

twice daily, and occupies only a few minutes. The lower portion of the gut can easily be washed out by introducing a thick rubber tube into the rectum, seating the patient upon a chamber, and injecting fluid through the artificial anus. This procedure is an important one, especially in the case of syphilitic stricture. The history of this patient I shall mention briefly. She is a married lady, about thirty-six years of age, who contracted syphilis from her first husband. I treated her for about six years for stricture of the rectum, accompanied with extensive and obstinate ulceration; colotomy was proposed long ago, but she would not consent to it. In October, 1886, a severe pelvic peritonitis developed, apparently due to extension of the ulceration to the intestine above the seat of stricture; there was considerable exudation, and an abscess formed that was evacuated through an incision made on the right side above Poupart's ligament. It was necessary to separate adherent coils of intestine in order to reach a large collection of extremely foetid pus, which filled the entire true pelvis. A counter-opening was made in the vaginal fornix. Within a few weeks the patient rallied sufficiently to admit of the performance of inguinal colotomy. In spite of her miserable condition recovery was perfect, and her strength and state of nutrition have been greatly improved. There is still a discharge of pus and blood from the rectum, yet it is much less than before.

A NEW METHOD FOR CURE OF HÆMORRHOIDS BY EXCISION.  
—In mild cases of hæmorrhoids, I have obtained good results by injecting equal parts of glycerine and carbolic acid. In severe cases complicated with prolapse of the mucous membrane I have adopted a method of operation that is to be commended not only on account of its facility and the completeness of the cure, but because of the fact that it is not followed by suppuration and necrosis of the tissues. It consists in excising the entire affected portion of the mucous membrane, and in suturing the edges of the remaining part to the integument. The essential advantages are the perfectly aseptic character of the process, and the small loss of blood. The operative procedure is as follows:

After the patient has been duly prepared by proper attention to diet, and the thorough evacuation of the bowels, a sponge is pushed high up into the rectum, and the lower part of the gut is thoroughly irrigated with a weak solution of corrosive sublimate, followed by one of boro-salicylic acid. The patient is thoroughly anæsthetized, so as to avoid straining and consequent venous congestion. The field of operation is constantly irrigated with an ice-cold boro-salicylic solution. An incision is carried around the anal orifice at the line of junction between the skin and mucous membrane, the parts being put on the stretch by making traction with tenacula. If the skin is flabby and in excess, a portion of it may be included within the incision; the latter is carried downward until it reaches the fibers of the external sphincter, the distended hemorrhoids being easily avoided. The mucous membrane is easily separated from the sphincter as far upward as may be deemed necessary. In this way the entire degenerated portion is isolated and, so far as the arterial blood supply is concerned, remains connected with the healthy tissue only by the vessels that supply it. So far but few bleeding points require to be secured. If now the entire diseased part should be excised, there would undoubtedly be a considerable loss of blood, as occurred in my first case; the mucous membrane would retract as it was divided, and the operation would be long and embarrassing. I, therefore, insert a number of buried sutures of iodoform cat-gut close to each other, between the base of the external flap and that of the separated mucous membrane; these do not include any of the fibers of the sphincter, neither do they penetrate into the rectum. Particular care should be taken to avoid the sphincter, since I have observed in several cases that the patient suffers from severe tenesmus if the stitches penetrate the sphincter. The sutures may be either continuous or interrupted; they secure nearly all the vessels supplying the hemorrhoidal portion. The mucous membrane is excised in parts, at a point from one-half to one centimeter above this line of sutures, and the cut edges are approximated by sutures of silkworm gut.

In several instances I have passed deep stitches which in-

cluded the entire sphincter, in order to diminish the tension, but I think that these can be dispensed with.

From the beginning of the third day following the operation, the patient is allowed to have a passage daily, and is kept on liquid diet for a week, at the end of which time the sutures may be removed; a few days later he may be allowed to get up, and at the beginning of the third week he will, in my experience, be able to attend to his business.

Much of the success of this operation depends upon the technique. From my own experience in about a dozen cases, the rapidity and completeness of the healing process, the comfort of the patient, and, in short, the neatness of the entire procedure, induce me to prefer it, in suitable cases, to other methods (Allingham's, Langenbeck's, etc.). Strict antisepsis and the avoidance of hemorrhage, in the manner described, are indispensable to success.

COMPLETE EXCISION OF FISTULA IN ANO.—Year before last I suggested, at a meeting of this society, the advisability of treating fistula by excision of the entire fistulous tract, the raw surfaces being brought together with sutures, with the view of securing healing by first intention. I described a certain method, but my experience at that time was derived from a few operations, the results of which were only partly successful, though encouraging. The first operation was performed two years ago upon a lady who had a deep-seated fistula, the internal opening of which was situated two or three inches above the sphincter. She was perfectly cured in two weeks. Since then I have had about a dozen cases, in which the extent of the lesion and the gravity of the operation varied, the results being as follows: In four cases primary union occurred without suppuration; in three a similar result was obtained with but slight suppuration; in four the wound healed by granulation, in a shorter time than it would have done after one of the old operations. In one instance I did not sew up the wound at all on account of inflammatory infiltration of the edges; in another, that of a gentleman whom I had treated during the acute stage of a very extensive gangrenous periproctitis, there was so much cicatricial tissue that I did not

venture to excise it all, for fear of removing so much of the muscle that incontinence might result. This patient has still an internal fistula, which causes no inconvenience, except a slight discharge.

My technique has been essentially the same as that described at a former meeting, viz., excision of the entire fistulous tract, together with all the lateral sinuses, such as not infrequently exist in the cellulose-adipose tissue above the sphincters, and union of the deep tissues by means of buried sutures of iodoform-catgut, as well as accurate adaptation of the edges of the mucous membrane. Several include the entire field of operation, in order to relieve the tension of the parts. The field of operation is constantly irrigated with boro-salicylic solution. The edges of the integument I prefer to unite by only a few sutures, in order to allow drainage of the first secretion. Opium is administered during the first two days; after the second day the bowels are moved easily with injections, a sitz-bath being used after defecation. I have performed this operation only once in a case of fistula of tuberculous origin, the result being perfect. There was a large, shallow sinus, which did not communicate with the rectum—a condition which, in my experience, is not infrequent in tuberculous fistulæ. I am skeptical regarding the existence of so-called incomplete external fistula in any other cases, having always succeeded in finding the internal opening, except once in a dermoid fistula. Neither do I accept the general opinion that muscular contraction prevents a fistula in ano from healing; it is very probable that entrance of obnoxious matter into the sinus causes repeated attacks of inflammation and accounts for the chronic nature of the affection. In the last patient, upon whom I operated a few days ago, I did not find an internal opening, its former site being occupied by a slight elevation covered by a thin cicatricial tissue. This was probably only transient cicatrization. In the *Medical Record* of June, 1886, Dr. Stephen Smith published a paper on this subject, in which he stated that in 1879 he conceived the idea of treating fistula in this manner after reading in Dr. Emmet's book a description of that gentleman's plastic operation upon

the perinaeum. At that time Dr. Smith excised the granulating surface of a fistula that had been operated upon unsuccessfully six months before; consequently, that operation was scarcely applied to a fistula proper. He does not state just when he adopted the method described by him, but if it was immediately after the operation above mentioned, he was probably the first surgeon to practice it. I take the liberty of claiming priority in my description of the details of the operation, and especially the use of antiseptic precautions, which differs in no essential feature from that given by him.

A NEW OPERATION FOR PROLAPSUS ANI.—The operation about to be described was devised to meet the necessities of the following very aggravated case:

For almost twenty years Mr. P. G. has been suffering from prolapsus recti, with more or less incontinence. It seems that an inflammatory disease of the rectum (probably dysentery), accompanied with intense tenesmus, was the original cause. He has been operated upon a number of times after the usual methods (cauterization and excision of the mucous membrane), but apparently with only transient and partial relief. After one operation done by my colleague, Dr. Adler, he was improved for several years. Altogether he had undergone five different operations, when, in October last, he was readmitted into the German Hospital. He suffered from incontinence as before. The anal ring was quite relaxed and wide open, and even with slight pressure the rectum was pressed out. The patient assured me that the prolapse was at times worse than ever before, and from Dr. Adler's statement I concluded that formerly the rectum would protrude to the length of fully six inches.

Not taking into consideration cases of partial prolapse of the rectal wall, we must admit that our methods of treating prolapsus recti do not yield very encouraging results. Once, in pre-antiseptic days, I assisted at the operation of amputating an extensive prolapsed portion after a preliminary operation, the purpose of which was to set up an inflammatory adhesion of the peritoneal layers. The patient died several weeks after from septicæmia. The amputation was done, if I am not mistaken, with the galvano-caustic snare. In our present aseptic era, I believe that such an operation, or a similar



one, would be much less dangerous; but the question is, Would the result be lasting? As long as the lower part of the gut is allowed to pass through a widened and relaxed muscular sheath, which is formed by the levator ani and the sphincters, and the lowest portion of the rectum itself remains wide, there is always, I think, a strong probability of recurrence. I therefore, in my method of operating, have tried to meet both indications—to narrow the rectum as high up as possible, and to fix around it a narrowed muscular ring. Anatomical and clinical observation lead me to infer that the levator ani takes an important part in the closure of the rectum. Be kind enough, gentlemen, when the opportunity presents, to place the tip of your finger upon the anus and then try to make that muscular effort by which you prevent the passage of fæces. You will find that your anal orifice is not only lifted, but also slightly drawn forward against the perinæum. This, I presume, is due to the action of those fibers of the levator ani which, in passing behind the rectum and uniting with those of the opposite side, form a strong muscular arch which in contracting must necessarily exert a pressure against the posterior wall of the gut, and in this way cause closure of the same.

I operated in the following manner: The patient was fixed on the table in the knee elbow position, a thick cushion placed between his knees and under the lower part of his thorax and the upper part of his abdomen, giving a sufficient support; his legs were tied to the table, and his head rested sideways on a pillow. I have lately performed almost all my rectal operations with the patient in this position, and I cannot recommend it enough. The hæmorrhage is decidedly diminished, the parts are all more accessible, and the principal vessels can nearly all be secured before they are divided.

An incision was carried from the lower part of the sacrum down to the anus until the posterior wall of the rectum is reached. I then removed the coccyx, for two reasons—first, I wished to narrow the gut as high up as possible, and, secondly, I thought that the proposed action of the levator ani might thus become less impeded.

The lumen of the rectum was narrowed in such a way that buried *étage* sutures of iodoform catgut were introduced which did not perforate the entire thickness of the gut, the first row being inserted near

the middle line, and forming a fold in the posterior wall, which protruded against the rectum. In this way the more lateral portions of the gut, as far as it could be done without causing too much tension, were brought into apposition. Then the surfaces of the levator ani and sphincter externus, which had been dissected back in order to lay bare the posterior wall of the rectum, and next their cut surfaces, were united by similar sutures. In order to secure a more lasting union, several buried sutures of silk-worm gut were also inserted into this muscular crest. Finally, a few sutures in the integument were introduced, and the cavity corresponding to the removed coccyx was left open and loosely filled with iodoform gauze.

The healing process proceeded without any special disturbance. Everywhere the sutured parts united by first intention, and only from that portion of the wound which had been left open did a slight secretion take place. The patient's control over his bowels began to be manifest after the first few weeks, and never after the operation did the prolapse recur. Gradually the muscular closure became more and more energetic, and now, if a finger is inserted into the rectum, a very firm voluntary action of the muscles can be made out. The greater depth of the rima ani is observed, and the fact that it is drawn inward by the action of the levator. I have tried, in a case of extirpation of the rectum for melanotic tumor (I show the specimen), to secure muscular closure by uniting the levator ani. The result is not absolutely perfect, but the patient, a woman of about forty years, has more control over her bowels than these patients usually have. Only about three inches and a half of the gut, including the sphincter, were removed in this case. Of course, in more extensive operations, where the gut cannot be sufficiently pulled downward, this plan cannot be executed.

REPORT OF FOUR MONTHS' OPERATIVE WORK  
AT THE NEW YORK HOSPITAL.<sup>1</sup>

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IT is with some hesitation that a surgical paper in this form is now brought before the members of this society, but it is believed that, beside the details of interesting and important operations which are here presented, the opportunity that is thus afforded of making short comments on both major and minor points in surgical practice may be productive of value, if not in the paper itself, at least in the precedent that may be established. Personally I feel that much that is hardly worthy of a separate paper must be continually developing in the practice of my hospital *confrères* that I should be glad to hear about. The city is so large and time so valuable that we have but little chance of visiting one another's wards, and, unless some specified mooted topics are deliberately announced for discussion and comment, I do not know how better such can be considered, or the experience of our hospitals grouped, than in the way I have this evening ventured upon. It is easy, also, for me to see that this can be done in a much more satisfactory manner than is now attempted, and time will quickly prove this, should my example be justified by an imitation.

It is known, I think, to all the members of this society that the majority of our hospitals are conducted upon what myself and others consider the erroneous plan of allotting to each of the attending surgeons terms of service ranging from two to six months, depending upon the number of surgeons connected with the hospital. Lately an improvement has been made in several of the hospitals, of which the New York Hospital is one, by which the term has been increased to an average of six to eight months. It is anticipated that in a short time a further beneficial change to a continued service (such as is resorted to

<sup>1</sup>Read before the New York Surgical Society, Feb. 9, 1887.

as a rule in England and on the Continent) will be fully established. The foregoing remarks are intended to be explanatory of the statement that my last assignment to service has extended from August 1, 1886, to February 1, 1887, but, by reason of my absence from the city, it has only embraced a period of four months, beginning October 7, 1886. From that time until the present, having under my charge wards comprising 55 beds, I have had out of 339 cases of all kinds 105 operations to perform, a large number of which were of importance. Of these there were 19 on the head and neck, 53 on the trunk (of which 23 were on the genito-urinary apparatus) and 33 on the extremities. This is a division which, while not strictly scientific, allows of ready grouping of cases, and it is on this account adopted.

The operations on the head and neck were principally as follows: Two were done for the relief of deformity of the nose. The points in each case are worthy of brief mention:

*Deformity of the Nose from a Fall.*—C. E. P., æt. nineteen, was admitted January 4, 1887, with the history that fifteen years before he fell into an area, a distance of seven feet, striking on his nose, and flattening it by apparently crushing in the cartilaginous septum. The nose is now increased in breadth at the lower part and is sunken in, and the bony plate of the nasal process of the maxillary bone is unduly prominent. The septum is much thickened for half an inch below the skin, but is not deviated. On January 7, Dr. Weir, with a fine wood-engraver's chisel, cut through the nasal processes from without and forced them inward and toward each other, holding them *in situ* by a needle passed transversely across the nose, the ends being prevented from pressing against the skin by pads of iodoform gauze. At the tip of the nose from within the nares the thick skin was separated from the cartilage for a considerable distance by subcutaneous dissection, and was pulled forward and held in place by a silver wire clamped at each end with a shot over little cork plates, so that the broad freshened under surfaces of the skin should be brought together.

The upper pin was removed on the fourth day, as some sloughing was apprehended on account of pressure; this was immediately relieved. The lower wire was kept *in situ* twenty-four hours longer, no

ulceration having occurred under the cork-pads. Lateral compresses were retained for a few days longer. The result was excellent in this case, as will be seen by the patient himself, who is submitted for inspection.

The second patient had the end of his *nose bitten off* in a fight; the operation consisted in replacing the parts lost. The result was fully satisfactory, though it was subsequently necessary to utilize a portion of the columna in order to fill up a slight gap in the edge of the nostril.

Besides the operations on the external nares, there were two others of more importance. One was for a *peculiar bony tumor of the nose*, met with in a young woman of twenty-two, who had since her tenth year difficulty in breathing through the right nostril, which had lately increased, and which has been associated with hemicrania on the corresponding side. At the orifice of the nostril is seen a fleshy growth, beneath which is a firm, bony mass. Nothing could be passed into the nose by the side of it. Although no swelling of the cheek existed, it was determined at the operation, after the exposure of the bone by the usual incision carried from the middle of the lip around the nose, to open the antrum in order to see if the growth invaded that cavity. This was done with a small gouge, and it was found to be free from disease. The bony growth, which apparently consisted of the greatly hypertrophied inferior turbinated bone, was removed with a forceps, and the operation was thought to be completed; but it was noticed that the blood which collected in the nose did not run down the throat, and this was found to be due to the fact that the posterior portion of the bone shut off the posterior nares, only permitting a fine probe to be passed into the naso-pharynx. This part of the bone was thereupon removed, then the passage was found to be quite clear. The patient has since been free from all unpleasant symptoms, except the annoyance due to collections of muco-purulent crusts.

The remaining nasal case was one of *fibro-sarcoma of the nose, removed by Chassaignac's operation; recurrence in the brain*. The patient, a man æt. forty-two, had been troubled for over a year with a stuffy feeling in the right nostril, associated with hæmorrhage. Two months before his entrance into the hospital a tumor appeared in the right naris, and an unsuccessful attempt was made to remove it by means of the snare. On his entering the hospital, his nose was examined by means of a rhinoscope, and the naso-pharynx was found to be free from disease, the posterior limit of the growth reaching not quite to the posterior nares. An attempt was made to remove it by cutting across

the nose at its attachment. on a level with the eyes, and sawing through the nasal bones, carrying the cut downward on the right side of the nose along the labio-nasal junction to the left ala. This allowed the whole nose to be tilted to the left side, and gave free access to the entire tumor. After removal of a quantity of a soft growth by means of the curette and wire loop, it was found that the neoplasm extended so far into the ethmoidal and sphenoidal cells that it would be unsafe to follow it farther. The cavity was packed with iodoform gauze, and the patient made a speedy recovery, leaving the hospital two weeks later much relieved. Six weeks after, he began to have slight divergent strabismus and amblyopia in the right eye; soon there was total loss of vision in this eye, and the other eye also began to be affected, showing plainly that the neoplasm had extended to the brain, or at least beyond the cranium. By the aid of the rhinoscope its recurrence in the nose could also be perceived.

Irrespective of the cerebral extension, it would have been better in this case to do the usual partial resection of the jaw, according to Maisonneuve's suggestion, as this would not only have allowed a more thorough extirpation of the growth, but would have enabled one to detect and to treat early any recurrence.

In addition to the foregoing operations on the face, there were one for necrosis of the upper and one of the lower jaw, one for hare-lip, closed by Mirault's method, and one for the removal of an extensive mushroom epitheliomatous growth, four inches in diameter, on the side of the face in an old man of seventy-three, the operation being performed for the arrest of hæmorrhage, which was becoming profuse and frequent. The growth contained scattered epithelial cells.

Another operation was performed for the removal of epithelioma involving the entire lower lip, a V-shaped incision being made, and a new lip formed, after Burow's method. The interesting point in this case lay in the fact that, although the clinical appearances of epithelioma were typical, neither the mass removed nor an enlarged gland (extirpated from beneath the right side of the jaw) showed any microscopical evidences of epithelioma until more than thirty slides had been examined by the pathologist. This may serve as a lesson not to trust



too much to the microscope in cases of small sections of suspicious growths, especially those of the mouth, tongue, and similar localities. There was one operation for the relief of neuralgia of the inferior dental nerve, the details of which are as follows:

*Intra buccal division of the inferior maxillary nerve* was done for severe neuralgia, affecting the right side of the face, but principally the lower teeth, and associated with flashes of pain along the course of the auriculo-temporal nerve. This had existed at intervals for over three years, but during the past ten months the pain had been more or less continuous. All the usual internal or local treatment—such as with quinine, arsenic, aconitine, morphine, electricity, etc.—had been tried, but without giving relief. On October 11, 1886, the patient was etherized, and, his mouth being held open by a gag, an incision was made, extending from the upper to the lower jaw, along the inner edge of the latter. The spine of Spix was exposed, and the nerve seized with a strong, slender forceps at the point at which it enters the dental canal, and divided with scissors above and below the forceps. The small mass removed, however, did not plainly show nerve tissue, whereupon a blunt hook with a short curve was introduced two or three times, until finally it was passed well back and drawn forward, when it seized a cord which was supposed to be the nerve. This was divided with scissors, when quite a severe hæmorrhage took place, which could only be controlled by rapidly packing the wound with iodoform gauze. The hæmorrhage recurred the same evening, several ounces more being lost, but it was checked by additional compression, the jaws being firmly bound together so as to force the compress against the wound. The gauze was removed from the wound piecemeal, the last being taken away by the tenth day. The patient has been free from pain from the time of the operation up to February 1, when she was last heard from, and has gained greatly in flesh.

Whether the hæmorrhage came from the inferior dental artery or, as I feared at first, from the internal maxillary, I cannot positively determine, but since I have heard of a similar mishap in an operation conducted in a much simpler manner than mine, I am led to think that it arose from the former vessel. I have performed this operation now three times. In the first case it was readily completed by the re-

removal of a small portion of the nerve, grasped by the slender forceps which were used, and the success was permanent. In the second a good deal of difficulty was encountered, and, although the nerve was finally divided, the pain recurred after an interval of three months.

*Of the Surgery of the Brain*, two interesting examples can be given, the first being

A case of *cerebral abscess* following an old injury. The patient in 1880 received an injury of the left frontal region, just above the eyebrow, by his gun exploding and lodging its breech-pin in his brain. When it was extracted at the hospital, the anterior clinoid process of that side could be felt by the finger. A number of bone fragments were removed, together with some brain-substance. No cerebral symptoms followed until four months later, when occasional epileptic fits appeared; but none have occurred during the last two years. Last summer he had a painful pulsating swelling over the site of the old injury, which passed away under treatment with large doses of iodide of potassium and local blistering. About ten days ago he began to have much pain and headache on the left side of the head, over the brow. When sent to the hospital by Dr. Seguin, on November 7, 1886, there was some oedema of the left upper lid and great sensitiveness over the region of the old cicatrix, and there was a feeling of deep fluctuation. There was no paralysis of motion or sensation. Under ether a V-shaped incision was made, the old scar being raised, when an opening in the skull the size of the thumb-nail was exposed; this was filled by a dense membrane, which pulsated visibly. A puncture with a hypodermic needle revealed the presence of pus, whereupon the membrane was incised and nearly two teaspoonfuls of pus were evacuated. The abscess cavity extended nearly an inch beyond the level of the skull. It was at first thought that it might be the original frontal sinus, but its depth and the evident pulsation showed that it was within the cranial cavity, although shut off from the brain by a thick layer of inflammatory material. It was packed from the bottom with iodoform gauze.

During the evacuation of the pus the patient's respiration wholly ceased, and only by practicing artificial respiration, lowering the head, and administering whisky hypodermically, could it be started again. It was a question whether this was due to the ether, to the interference with the brain, or to both factors.<sup>1</sup>

<sup>1</sup> This phenomenon has been noticed by others in cases of abscess of the brain. See Nancrede, 'Trans. of the Am. Surg. Association,' vol. ii.

The second case was an unsuccessful attempt at removal of a sarcomatous tumor from the brain. Spurred by the brilliant, though unsuccessful, result of operative interference in cranial growths at the hands of Godlee in 1884,<sup>1</sup> whose case was followed by another reported by Hirschfelder and Morse,<sup>2</sup> and by a third and fourth by Horsley<sup>3</sup> (the latter's paper, rich in suggestions, was received too late to be of use in the case to be described), surgeons will undoubtedly be led to widen their domain, and exploratory operations in this region of the body will soon become numerous. The history of an unsuccessful case will, however, serve an important purpose, and it is now intentionally brought strongly forward in order to illustrate the difficulties that surround the subject, not only for the surgeon, but for the neurologist who guides his knife.

*A Case of Trephining for Sarcoma of the Brain; Temporary Relief from the Operation, but Death Ten Weeks Later; Tumor of the Cerebellum and Cord.*—Mary R., æt. twenty-six, was admitted into the hospital September 16, 1886, with the following history: The patient has had four operations in this hospital for sarcoma of the neck, the first two years ago, the last six months ago. During the last operation the brachial plexus was freely exposed, and the patient afterward suffered from paralysis of the left upper extremity; from which she has only partially recovered. For two months or more she has been annoyed by precipitate micturition and defecation. Six weeks ago she first noticed cramps in the calf of the left leg, which usually occurred at night and prevented her straightening the limb. About the same time she noticed that the left knee frequently gave way under her while she was standing, and once she fell in consequence. During the last week she has had occasional clonic spasms of the left leg. Frequent cramps and numbness in the left hand have been noted during the past six weeks; during the past two weeks the right has been similarly affected. For three weeks she has suffered from frontal headache, generally confined to the right side, and always worse on walking. Besides this, she often "feels as if her head was being hammered."

<sup>1</sup> "Lancet," vol. ii. 1884, p. 1090, and vol. i, 1885, p. 13.

<sup>2</sup> "Pacific Med. and Surg. Journal," April, 1886, p. 210.

<sup>3</sup> "Brain Surgery," "British Med. Journal," October 9, 1886. Four cases are given, two operations being undertaken for tumors, with satisfactory results.

On examination, no tenderness is found at any part of the scalp, or over either supra-orbital nerve. There is no paresis of any muscle supplied by the cranial nerves. The right hand is perhaps a little weaker than normal, but the old paralysis of the left hand prevents any comparative test. Paralysis of the left sympathetic is shown by narrowing of the left palpebral fissure (from sinking of the eyeball) and contraction of the pupil. The left biceps, triceps, and deltoid muscles are paralyzed, and there is paresis of the left leg below the knee. The left patellar reflex is exaggerated. Ophthalmoscopic examination shows slight optic neuritis on the left side, the disc at the point of exit of the large blood-vessels being indistinct.

*September 26.*—The paralysis of the left leg has gradually increased, and at times there is twitching of the right side.

*October 11.*—While waiting for further developments she became rapidly stupid, and, after consultation with Dr. Amidon, who had had the patient under observation prior to her entrance into the hospital, an operation was advised, and was performed under his directions.

*Operation.*—The position of the fissure of Rolando having been previously marked out, and the tumor located at the upper limit of this fissure, one inch from the median line, the scalp having been shaved at this point, a crucial incision was made, the longer cut being just in front of and parallel with the fissure. The scalp was dissected up, and with a large trephine a button of bone was removed from a spot one inch and a half to the right of the median line; this opening was enlarged with a double gouge-forceps to the size of an inch by an inch and a half. The dura mater was found to be very tense and bulging; a crucial incision was made through this membrane, whereupon the deeply congested brain substance projected into the wound. Nothing was felt by the finger, and a needle carried in several directions encountered no resistance. As the brain now projected above the level of the skull, a piece half as large as a hen's egg was excised and reserved for microscopical examination. Its substance was deeply pigmented and very vascular. The bleeding was quite profuse, but it was checked by pressure and by Paquelin's cautery lightly applied. The flaps of the dura mater were laid over the cut surfaces of the brain and covered by a strip of iodoform gauze, one end of which was allowed to protrude from the posterior angle of the wound. The scalp was sutured closely up to the latter point, and a dressing of bichloride gauze was applied. The iodoform gauze was drawn out forty-eight hours later. The wound healed rapidly, but within six days the brain bulged through the cranial opening beneath the healed scalp, and the hernia gradually increased until it reached the size of a hen's egg.

No unfavorable reaction followed the operation. The following signs of improvement were observed and were attributed to the lessened cerebral tension, viz., the headache disappeared immediately and did not recur. The spasms of both limbs also ceased, and a temporary improvement in the impaired muscular power of the left side was likewise observed. The portion of brain excised from its gross appearance suggested the possibility of its being infiltrated with a soft sarcomatous growth, but the microscope showed nothing abnormal. About three weeks after the operation more decided evidence of analgesia and paresis of the right side appeared more clearly, and the same phenomena were increased on the left. It was evident that the neoplasm, or a second one, was situated at the upper portion of the cord, or in or near the medulla. The patient gradually became more paralyzed, and died December 25, nearly two months and a half after the operation. The report of the autopsy, as made by Dr. Amidon and Dr. Vought, together with the description of the tumor by the pathologist, Dr. Peabody, is appended.

*Autopsy.*—The hernia cerebri, so prominent during life, had entirely collapsed. On removing the scalp, it was necessary to divide some connective tissue between the scalp proper and the more intimate covering of the hernia. There were slight adhesions around the trephine-opening, between the dura and the pia. On removing the calvarium, a considerable protrusion of apparently disorganized cerebral substance appeared at the site of the operation. The blood-vessels of the pia and the pia itself over the entire brain were normal. On making a transverse section through both hemispheres, nothing abnormal was found except a slight diffuse hardening (probably inflammatory) in the *centrum ovale* beneath the site of the operation. The ventricles were normal. At the base of the brain there was seen a grayish, translucent tumor, springing from the lower surface of the left lobe of the cerebellum and compressing the subjacent medulla, the latter being displaced forward and to the right side. The medulla was compressed at a point below the calamus, where it was much flattened. On dissection, the substance of the medulla proved to be entirely uninvaded by the growth, the connection of which with the cerebellum was very intimate. An incision through the antrum of the left cerebellar lobe showed no diffuse infiltration of that body. The fourth ventricle was invaded by the growth, but was apparently out of the line of direct pressure. Starting from the cerebellum, as described, the tumor extended down the left postero-lateral region of the spinal canal, between the dura and pia for a distance of at least ten cm., the cord being naturally much

displaced to the right side and anteriorly. The tumor was grayish, translucent, and non-vascular, and presented no evidences of inflammation at any point. It had no connection with the cerebellum, having apparently originated in the pia. Small portions of the fourth, fifth, and sixth spinal nerves were removed and were found to be normal. A small subcutaneous fibrous tumor was excised from the back, just below the right scapula.

*Microscopical Examination*—Sections of the tumor of the cerebellum and cord were examined, and the growth was found to be an ordinary spindle-celled sarcoma, containing many round cells. It was not very vascular, and the stroma was not abundant.

Another case of supposed tumor of the cerebellum now in my wards illustrates the diagnostic difficulty of such cases, as four neurologists, after an examination of the patient, have assigned different cerebral localities to the growth. In this, and in fact in all points bearing on this subject, the admirable collection of one hundred cases of cerebral tumor, with their analysis, by Dr. W. Hale White, lately published in "Guy's Hospital Reports,"<sup>1</sup> will be of great service to the investigator. Of the tuberculous growths (forty-five in number), more than half occurred in children under ten, and when found in adults, there was usually tuberculous disease elsewhere; like the carcinomatous tumors, five in number, all multiple and secondary; all these are unsuitable for surgical consideration. Out of the twenty-four gliomata and ten sarcomata (the cysts being only four in number and too rare to be considered), which alone offer a reason for surgical interference, there were only four growths that could have been removed with any certainty, two of which were gliomata, and situated in the cerebellum. Only one of the ten sarcomata was removable. Aside from the fact that the situation often precludes the operation, the frequent occurrence of infiltration in connection with sarcomatous growths will have the same effect. This infiltration existed in the case reported by Hirschfelder, in which only a portion of the neoplasm could be removed, the patient dying eight days later from suppurative encephalitis. White's other cases included five gummata, two glio-sarcomata, one

<sup>1</sup> Vol. xxviii, series 3, 1885-86.



lymphoma, one myxoma, and three which were of a doubtful nature. Taking into consideration the question as to whether tumors could have been sufficiently localized during life to warrant surgical interference, White found from this clinical standpoint that three tuberculous tumors might have been removed, and that four gliomata, one sarcoma, two cysts, one myxoma, and two of the three doubtful growths, or 10 per cent. of the number, might have been operated upon *provided a correct diagnosis* could have been made, a condition that is sadly nullified by his just statement that the best diagnosticians so frequently make mistakes, that a certain number of cases suitable for operation might be unsuccessful, because the position of the growth was not exactly defined. For further information concerning this interesting though somewhat obscure and difficult subject I would heartily refer to this article *in extenso*. For the special points in the operative technique, the best yet given is by Horsley, and is briefly summarized as follows: In addition to a strict antisepsis, he makes an oval scalp-wound and a very large cranial opening, using a trephine two inches in diameter, and replacing the bone when possible. The dura mater is incised in a circular manner, and is turned back like a large flap. In incising the brain, the cuts should be vertical and directed into the corona radiata to avoid damage. Hæmorrhage should be checked by pressure; drainage of the wound is also urged. Stress is laid by him on the immediate bulging out of the brain as indicative of a tumor. It was noted in all three of his cases and in my own; it is not met with, he says, in healthy animals on which he has tested this experimentally. This is, therefore, a symptom of intracranial pressure of high importance.

On the neck seven operations were performed, viz., two for sarcomatous tumors, one for removal of a huge secondary glandular epithelioma (thought to be sarcoma until the microscope corrected the diagnosis; time subsequently showed what had escaped previous detection—primary trouble in the œsophagus at the level of the cricoid), one for keloid of the neck, and two for papillomata of the larynx. The latter can be summarized in a few words.

The first case was one of *crico-laryngotomy*. The patient was a girl, æt. eight years, who had lost her voice a few months previously, and had recently had frequent attacks of dyspnœa. Since Dr. Lefferts was unsuccessful in his attempts to extract the growth through the mouth, in spite of the courageous assistance of the patient, she was sent to the hospital to have thyreotomy performed. This was done under ether, November 6, 1886. A preliminary tracheotomy below the isthmus having been done, the cricoid cartilage was divided unintentionally, and then the thyroid, so that the whole larynx was thus laid open, a perfect view of the growth being obtained. It was attached anteriorly to the left side just below the cord; after its removal with slender scissors, its base was touched with chromic acid; the thyroid and cricoid cartilages were accurately sutured with catgut, as well as the entire wound. The tube was kept in until the next day, when the breathing became rapid and signs of broncho-pneumonia appeared. As the larynx was pervious, the tube was removed, as being a possible source of irritation. The patient passed through a prolonged convalescence, and during the first week of her illness, in consequence of the coughing and the catgut which I now think was wrongly selected for sutures, the wound in the lower part of the thyroid and the cricoid gaped widely, necessitating the use of two wire sutures to close them, at the expense of exact coaptation. The patient's voice was restored, but when she left the hospital (December 20) she was still hoarse. The wound had healed perfectly. The risk of voice impairment led in the second case to a change in the operative procedure, at the cost, however, of thoroughness of the removal of the growth.

*Cricotomy for Papilloma of the Larynx.*—A girl, æt. two years, was sent to me by Dr. Lefferts as unsuitable for surgical treatment *per vias naturales*. She had been hoarse since she was a few months old, breathed with difficulty, and had lately had several severe paroxysms of dyspnœa. On November 20, 1886, by an incision two inches long, the cricoid cartilage and crico-thyroid membrane were divided, and the edges of this wound in the air-passages held apart, thus giving a very good view of the papilloma, which was removed in numerous small masses by means of slender forceps, fine scissors, and a small sharp spoon. The larynx above was readily explored by holding the cords open with a forceps. The wound in the cricoid cartilage was closed with catgut, and rapid recovery followed, so that by December 8 the incision had closed, and the patient left the hospital breathing easily, although her voice was not restored. Subsequently it was learned that phonation became intermittent, showing that a portion of the growth had probably been left *in situ*.

In addition to the foregoing there was one operation for the removal of an *adenoma from the substance of the thyroid gland*, after Socin's method, which has already been reported to this society, and beside this, a rather pleasing result in the treatment of an intractable affection was obtained by the

*Extirpation of a Sub hyoid Bursa.*—The tumor had existed for fifteen years in a young man of twenty-two, and had attained the size of a small egg. It had been tapped and injected with iodine at another hospital four months before. Appreciating the difficulty of dissecting out these troublesome thin-walled cysts satisfactorily, I emptied this one with a trocar and canula, and then injected into it melted paraffin (which liquefies at a point much below boiling-heat), and subsequently cooled it with a small bag of ice. The whole procedure did not occupy five minutes, and by its aid I was enabled, after exposing the cyst by dividing the skin and thyro-hyoid muscles, to remove with great ease the entire sac, even up to its attachment at the posterior border of the hyoid bone, which part would undoubtedly have escaped me had the cyst remained flaccid instead of being rendered a hard, dense mass.

This method has in other instances served me well, and is to be commended, because it avoids the persistent fistula which so often results from this bursal inflammation.

Of the 52 operations on the trunk, 5 were for tumors of the breast—viz., one simple and one cystic adenoma and three carcinomata, two of which were primary and the third a recurrent growth. In *amputating the breast for cancer* I adhered to the custom of removing not only the entire gland, but also the contents of the axilla, even though no enlarged glands were felt through the skin, or even after the axilla was opened. In doing this, the directions first given, I think, by Bickersteth, of Liverpool, have been followed—viz., to carry the incision well on to the arm on a level with the insertion of the pectoralis major, and then to tear or to cut lightly through the layer of fascia there present, when, with the aid of blunt scissors or the finger-nail, the axillary vein can be isolated throughout nearly its whole extent, especially if the pectoral muscle is drawn upward by means of a broad retractor. If it cannot be so ex-

posed, and it is necessary on account of glandular enlargements, the pectoralis major and minor are divided without hesitation. After the vein has been duly cleared, the deposit of fat in the axilla is easily peeled away from the chest-wall, any veins of considerable size being tied before being divided. On account of the size of the cavity thus made and its extension toward the angle of the scapula, it is sometimes necessary to make the drainage opening for the axilla well below the line of incision. More important, because it is little known, is the fact that, in addition to the infected glands near the axillary vein, there is frequently found an enlargement of a lymph-vessel, together with several minute glands, which run under the pectoralis minor in a line extending toward the sterno-clavicular articulation. I have so often found these since my attention was accidentally directed to them a few years since, that now I never fail to hunt for them, and frequently find them. One patient with tuberculous axillary glands was also operated on in whom the infection had apparently come from a slight wound in the hand.

There were six cases of hernia, two being strangulated, two irreducible, and two reducible, and all of the inguinal variety. The radical operation was performed of tying off the sac and sewing up the ring by Czerny's method in one case, and in the five others by tucking up the sac and sewing up the canal and ring, as suggested by Macewen. The latter operation has been simplified<sup>1</sup> by exposing the external abdominal ring and then pulling apart the tissues over the sac with forceps until the latter is reached, when it can be readily lifted out of its bed with much less disturbance and more certainty than if reached first at a point lower down. There is also less chance of suppuration, on account of the slight disturbance of the cellular tissue.

When the omentum is found in a hernia, whether reducible or irreducible, it is carefully tied off with multiple and a final encircling ligatures; where there are omental adhesions plug-

<sup>1</sup> See a paper on "Reducible and Irreducible Hernia," by the writer, read before the New York State Medical Society, February 3, 1887. "Medical Record," March 5, 1887.

ging the internal ring, they are detached with the finger, so as to allow the omental stump to drop back into the abdominal cavity. I am able to show here a specimen removed from a patient who died from pneumonia and kidney disease three weeks after a radical operation for a huge incarcerated omental hernia, which, after removal, weighed about twelve ounces, the sac being tied off and removed, but the ring was not closed. Everything has healed up solidly, and adhesions have formed in the vicinity of the internal ring, which shut it off entirely from the influence of intermittent and abdominal impulses. I may remark here, as of some possible interest, that of the six cases recorded by Ségond, in which a post-mortem was held after tying off the sac, in only three instances was the internal ring satisfactorily closed. My individual preference (my experience in this operation being limited as yet) is for Macewen's operation, as it accomplishes better not only the closure of the peritoneal funnel at the internal ring, but also the more perfect occluding or narrowing of the inguinal canal. I have, however, discussed this question elsewhere, and shall not dwell further upon the numerous interesting points connected with the radical operation for non-strangulated hernia. The percentage of success in this operation is about sixty per cent., and from the interannular injection of Heaton, of which one case is reported, about thirty per cent. of cures can be expected in inguinal herniæ of small size, in which the oblique canal still exists as such. Chromicized catgut is used in the radical operation for sewing up the canal and ring, in preference to silk or wire.

Among the cases is one in which, after the lapse of eight months, a silk ligature caused an abscess and fæcal fistula, which closed promptly after removal of the offending body. I have for over two years endeavored to secure healing of the wound by granulation, at least in that portion of it which is situated immediately over the external abdominal ring, as this, to my mind, affords an additional barrier to the recurrence of the hernia.

On and about the rectum ten operations were performed, three for ischio-rectal abscess of unusual size, which accounts

for their being included in a report from which abscesses and minor operations have been omitted, save when some point of interest could be elicited. Such an instance is shown by the four cases of *fistula in ano*, which were divided in the ordinary way. I had some eight cases in which this affection was treated by Jenks's<sup>1</sup> method of excising the fistula, and sewing up the fresh surfaces from the bowel to the original skin-opening. In three of these eight cases, in which the fistulæ were not deep and were of moderate extent, the patients did well; in the other five the fistulæ had deeper internal orifices, and their tracts were either longer or deeper, and in two instances there were diverticula, so that it was difficult to dissect out the suppurating tract itself, and the final introduction of the sutures was not easy, especially as regarded the closure of the rectal end of the incision. After all this had been done, failure was met with in four out of the five cases. As the last trial was as unfortunate as the first, I could not attribute it all to inexperience in the operation, and hence my faith in the method has been much diminished. In the four cases of hæmorrhoids I have likewise returned to the so-called method of Allingham, after trying in five cases Whitehead's<sup>2</sup> plan of cutting off the pile, tying the main vessels, and then sewing together the divided mucous membrane. There was in nearly every one of these cases so much troublesome venous oozing from the divided tissues (which had been cut somewhat as in Allingham's method) that the little operation was rendered unduly prolonged and annoying, and neither was there a rapid cure nor a subsequent diminution of the pain and other discomfort often encountered in operations for hæmorrhoids. I have also, in six cases, tried the crushing off of the pile after partial section, as practiced by Mr. Allingham, and with a fairly satisfactory result; but I have at all times the feeling that the patient would be safer from the risk of hæmorrhage when the vessels are tied, and sufficient advantage has not accrued so far to warrant me in incurring this possible danger. Two

<sup>1</sup> "New Method of Operating for Fistula in Ano." "Trans. of the Am. Gynæcological Society," p. 139, 1883.

<sup>2</sup> "On Hæmorrhoids." "British Medical Journal," February 4, 1882.



cases of *stricture of the rectum* were operated upon; in one the stricture resulted from an operation performed a year before for *imperforate anus* in an infant two days old. By an incision carried from the dimple of the anus to the coccyx, and gradually deepened to the extent of an inch and a half along the sacral curve, until a moderately distended rectum was reached and opened. The mother was instructed how to keep the opening patent by the use of plugs and the oiled finger. However, contraction gradually took place, and in December, 1886, the child was brought to the hospital for further help, it being in good condition but suffering from obstinate constipation. The opening had contracted to the size of a pencil. Under ether this was enlarged by nicking it, and principally by a cut posteriorly, so as easily to admit my finger. A bougie is still used occasionally, but the relief is complete.

The second stricture, which was in a woman and was apparently due to parturient causes, was situated from an inch and a half to two inches from the anus; it was a fibrous stricture, with a moderate amount of ulceration, and admitted only the little finger. Instead of resorting to Verneuil's proctotomy, or the modification of the same in which the knife was used in lieu of the galvanic or wire *écraseur*, I adopted a plan which I have used four times during the last three or four years, with excellent results. I had found on eight occasions that, in making a free posterior incision of the rectal stricture, extending back to the coccyx, the subsequent healing of the external wound was often very tedious, frequently occupying more than a year, and was also followed by more or less loss of sphincter power. I have, as before stated, changed this incision, especially in the case of strictures situated two inches and a half from the anus, to one extending posteriorly to the coccyx or sacrum, previously stretching the anus without dividing the external sphincter. To avoid the collection and retention of secretions in this wound pouch, a puncture is made with a knife, from the tip of the coccyx to the wound in the bowel, and through this is carried a drainage-tube; in other words, a traumatic fistula in ano is made. The wound in the bowel is then

packed with sticky iodoform gauze and an antiseptic dressing is applied over the anus. The bowels are kept quiet for several days, and, if the temperature shows that all is going well, the rubber drainage-tube is withdrawn on the third or fourth day. In every instance in which this plan has been tried, the tube opening has closed promptly, so that no fear need be entertained, I think, that a permanent fistula will be established. A large bulbous or rubber bougie is subsequently introduced at regular intervals according as one's judgment directs. The results as regards the recurrence of the stricture have been equally satisfactory with those obtained with the major operations, and more so as regards the rapidity of the cure. For strictures situated higher up, the open method is preferable, as it allows the surgeon to recognize and to repair any damage that may possibly be done to the peritoneum.

One case of *spina bifida* in a child eight months old was treated by injection; the tumor was of the size of a large orange, and was situated over the upper part of the sacrum. Cutaneous outgrowths extended from its base nearly to its apex, where they were lost in a thin, pellucid cyst-wall. Puncture had been tried some weeks previously, causing aggravation of the existing paralysis of the legs. The child was in robust health. A needle was thrust through the adjacent sound skin into the tumor, and about one drachm of a clear, colorless fluid (subsequently found to be free from sugar) was withdrawn, after which an equal quantity of Morton's fluid was slowly injected into it. This fluid consists of ten grains of iodine and thirty grains of iodide of potassium, dissolved in an ounce of glycerin. No special reaction followed its use, but a month later the swelling was decidedly smaller, though it is probable that a repetition of the injection will be necessary.

In the "Transactions of the Clinical Society" for 1884-1885 fifty cases were reported which were treated in this way, forty-one being successful, as opposed to twenty with five deaths after the use of simple tincture of iodine.

[TO BE CONCLUDED]

## EDITORIAL ARTICLES.

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### WIRE SUTURING OF FRACTURE OF THE PATELLA AS AN IMMEDIATE METHOD OF TREATMENT.

The treatment of transverse fracture of the patella constitutes one of the most interesting subjects of practical surgery. In the *Lancet* for November 17, 1883. Dr. Macewen, of Glasgow, first called attention to a new point in the pathology of this injury, this constituting a most important departure from the usually accepted view. The point in question consisted in demonstrating the existence of more or less of the prepatellar fibrous and aponeurotic structures lying between and upon the surfaces of the fragments. To this he attributes the frequent failure of union.<sup>1</sup> In the opinion of the writer the whole question of the obtaining of osseous union on one hand, or of a fibrous connecting band between the fragments on the other, turns upon this as a pivotal point. With the exception of the very rare instances in which the almost phenomenal coincidence of a fracture of the variety under consideration occurs, in connection with the escape of the prepatellar aponeurotic structure from all damage, and in which the fragments can be brought together with comparative ease by mechanical force directly applied, such for instance as Malgaigne's hooks, or Levis's modification of the same, these conditions alone excepted, it may be stated, in general terms, that, where an indubitable instance of bony union occurs, it is regarded as one of the curiosities of surgical experience.

There can be no question as to the desirability of obtaining bony union. The statements of so eminent an authority as the late Prof. F. H. Hamilton to the contrary notwithstanding, the patient who has but a ligamentous union of a fractured patella, has not, in the experi-

<sup>1</sup>See also ANNALS OF SURGERY for March of present year.

ience of most surgeons, a limb as perfect, functionally, as before. After many years, and when patients are apparently able to walk with perfect ease it will be found, upon causing them to attempt to perform such movements as are accomplished by the quadriceps extensor muscle exclusively, as for instance, the act of bringing the foot forwards with the knee held rigid, that they will not be able to perform this movement without bending the knee. Again, in cases of this kind, if the patient is placed in a recumbent position and requested to lift the limb from the bed without bending the knee, he will fail to do so. In other words, in these cases the quadriceps muscle is decidedly and permanently crippled in the performance of its principal function. It is true that in time the patient makes up for this deficiency by means of the psoas and adductors, and thus experiences no great difficulty in walking. He will be able, for instance, to mount a stair-case quite readily and in the ordinary way by having but one foot placed upon the stair at a time; but when he attempts to descend, he is usually compelled to have both feet at the same time upon the stair at each successive step. In this way alone, one may frequently detect the fact that ligamentous union exists following fracture of the patella. Patients may claim that they have perfect use of the limb, but either of the above tests will reveal an old fracture. These patients have learned in an unconscious manner to counteract the defect of contraction.

This condition of permanent disability may be due, in some measure, as pointed out by von Bergmann,<sup>2</sup> to an injury to the quadriceps muscle itself. In estimating the final result in transverse fracture of the patella, it is well to give due consideration to the possibilities of atrophy of this muscle and consequent progressively increasing inability to perform the normal movements of the leg. To this must be added the prolonged period of rest and the evil effects of tight bandaging incident to the prolonged use of splints and other retentive apparatus. There is reason to believe that this condition of the quadriceps interferes with the full use of the limb with much greater frequency than is generally supposed. Von Bergmann even goes so far as to as-

<sup>1</sup> See *Deutsch. Med. Wochens.*, Jan 6, '87.

sert that the condition above alluded to (injury to the muscle, or atrophy from non-use), is to be held responsible for inability to extend the leg properly, after this fracture, in a larger proportion of cases than incomplete consolidation. While there may be reason for questioning the full truth of this assertion, yet there can be no doubt that, if patients could be allowed to use their limbs at a much earlier period, markedly less disability would be present. The very feeling of instability due to ligamentous union will beget a fear to use the quadriceps extensor, and this latter in turn will become more and more inefficient, until the patient has finally learned to make his psoas and adductors functionate as extensors, in a measure; after which time the quadriceps will remain stationary, as regards the restoration of its function. On the other hand, an early restoration of the movements of the limb, and particularly that return of confidence in performing its natural movements consequent upon a restoration of its component parts to their normal relations to each other, will be the most certain method of preventing those evils mentioned by von Bergmann, the existence of which he has endeavored to turn as an argument against primary operations of suturing transverse patellar fracture.

No other result than that of bony union can be said to be a perfect one when osseous union is obtainable. In order to obtain this, measures must be taken to remove the interposed soft tissues from between the fragments, and bring the latter into firm apposition, and there maintain them. This can only be accomplished by making an incision into the joint, laying bare the bony surfaces, and where it is found impossible to disentangle the shreds of torn fibrous tissue from the rough surfaces and projecting spicules of bone, to remove a thin slice of bone from the opposing surfaces by means of the saw.

This discovery of Macewen's gives increased interest to the operation of opening the joint and applying the metallic suture in cases of this injury. As before stated, there cannot be two opinions as to the enormously great advantage which one patient, who has obtained bony union after a transverse fracture of this bone, has over another who has simply a ligamentous connecting band of variable length and stability between the upper and lower fragments. It is an equally indis-

putable fact that osseous union is obtainable with comparative ease in the hands of surgeons who possess sufficient boldness to carry into effect the measures necessary to obtain such a result. The indications for osseous union are therefore obvious, and the means of obtaining the same always at hand. It will be found in the great majority of cases that the only reason given for not attempting, in all instances of this injury, to obtain bony union in the first instance, is that all are not agreed in view of the fact that relatively good use of the limb is occasionally obtained by plans of treatment which involve no danger to life and limb, that the advantages gained in cases of osseous union are sufficiently great to offset the increased risk which the patient runs in obtaining the benefit of such a result.

In view of the fact that great reliance is now placed upon the use of antiseptic agents in order to ward off many, if not all of the dangers of this operation; and furthermore, as this part of our science and practice is at the present day making rapid strides, it is but fair to weigh with great regard the figures furnished by more recent writers upon the subject. It is the opinion of the writer, however, that but slight value can be placed upon the use of figures alone in this matter. The whole question will be determined upon the strictness with which individual surgeons follow antiseptic precautions in the treatment of wounds. A half-hearted antiseptis is worse than no antiseptis at all; many loopholes are left for error, and yet the claim will be made that the operations were performed antiseptically. It will always be found that in operations of this kind a surgeon's results will be favorable in direct proportion as he is well versed in antiseptic methods and is an enthusiastic supporter of the merits of the principle underlying the antiseptic system.

Prof. Dennis, of New York, has tabulated 186 cases of suturing transverse patellar fracture. Of this number, 75 are classified as being good as regards final result; 35 as being fair; 24 as poor. In this series 11 deaths are reported. Four suffered amputation, and 34 are stated to have had their recovery complicated with suppuration. Fourteen of those classed as being of poor result had complete ankylosis, while 17 of the cases denominated as fair had incomplete or partial ankylosis.



It should be stated in this connection that these figures do not represent the best work of those surgeons who practice aseptic or antiseptic surgery; they are collected from a variety of sources. It may be stated, as a general proposition, that the boldness which impels a surgeon to open the knee-joint and wire together the fragments of a fractured patella, is not always born of a perfect knowledge of those antiseptic measures which alone render such a procedure either safe or justifiable. In the 45 cases reported by Brunner,<sup>1</sup> it will be noted that only 18 pursued a strictly aseptic course. In 8 cases of this series the purulent inflammation assumed a dangerous character, two of them requiring subsequent amputation at the thigh; one of these latter terminated in death. In view of these well-known facts it is more than likely that if untoward results and their causes were to be summed up in one word, that word would be "sepsis." In the opinion of most surgeons of the present day, this latter is a preventible condition.

In view of these facts it will be for the surgeon to determine, in a given case, whether or not he has the requisite faith in and experience with, antiseptic methods and their power to prevent septic infection of the wound he is about to make. Certain it is, if any of the evil consequences following in the train of suppurative inflammation occur, they are to be traced to a want of sufficient care on the part of the operator or his assistants. The responsibility, therefore, of this operation should not be undertaken lightly, but once undertaken in the spirit of firm faith in, and a proper knowledge of the requisites of success and a careful application of the same, and the risks of this, as with many other operative procedures formerly considered unjustifiable, will be found reduced to a point where it will no longer be a source of alarm to the profession and laity alike.

Those who have had occasion to open the knee-joint many times must have been struck by the impunity with which this can be done, when strict antisepsis has been observed. This, to the writer, has been the source of much surprise and gratification. Patients have re-

<sup>1</sup>Deutsche Zeitschrift f. Chirurgie, 1886, Bd. 23, S. 23. Also referred to by von Bergmann.

covered under his observation, notwithstanding rough and prolonged manipulation of the tissues comprising the articulation, without supuration or other unpleasant sequence. Moreover, there is frequently observed an absence of that inflammation of an adhesive character which sometimes leads to unpleasant after-effects when the time comes for making efforts to promote the healthy movements of the joint. To those whose almost daily habit it is to observe such instances of the wonderful improvements wrought in operative surgery by the introduction of the present methods of wound-treatment, it seems to be by no means a difficult or dangerous operation to open the knee-joint and place the fragments of a fractured patella under the condition necessary for the attainment of the best possible result in such an injury. The operation, in the hands of skilful and thoroughly competent surgeons, is destined to become shorn of all its dangers, both imaginary and real, as an immediate method of treatment; it will, without doubt, in the not very far future, supplant the uncertain and tedious means at the disposal of our forefathers, and in vogue, to a great extent, at the present day.

After what has been said regarding the justifiability of suturing the patella immediately following a simple fracture, it would be superfluous to attempt to use any argument in favor of treating, in a like manner, a compound fracture of this bone. Here the indications are so plainly in favor of immediate disinfection of the wound and restoration to their normal condition, as far as possible, of the fragments, that but slight sympathy, at this day, would be extended to a surgeon in the event of a suit for mal-practice being brought against him based upon his failures so to act.

GEORGE R. FOWLER.

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#### ON THE CURE OF HÆMORRHOIDS BY EXCISION.

In connection with the experience of Dr. Lange, found on another page of this number of the *ANNALS OF SURGERY*, in the cure of hæmorrhoids by excision, the similar, and quite extended experience of Mr. Walter Whitehead, surgeon to the Manchester Royal Infirmary, England, will be of interest to note. The latter surgeon began the

practice of this method as long ago as 1876, having then abandoned the ligature, and the clamp and cautery, and having never used either of them since. In February, 1882, he published a description of his new method in the *British Medical Journal*, and again in the Section of Surgery at the 1886 meeting of the British Medical Association, at Brighton, he read a paper on the subject which has been published in the *Journal of the Association*, dated February 26, 1887. He contends that the internal hæmorrhoids, which are generally regarded as localised distinct tumors, amenable to individual treatment, are, as a matter of fact, component parts of a diseased condition of the entire plexus of veins associated with the superior hæmorrhoidal, each radicle being similarly, if not equally, affected by an initial cause, constitutional or mechanical.

He is of opinion that, when surgical treatment becomes imperative, the extent of the mischief can only be appreciated and effectively dealt with by a free exposure of the diseased vessels, and that no procedure fulfills this purpose short of a deliberate dissection of the lower rectal area.

And, finally, he considers that any operation, which has for its object the removal of hæmorrhoids, is not complete which does not provide for the readjustment of the healthy tissues, with the object of securing primary union and rapid convalescence.

The dread of hæmorrhage in excision of hæmorrhoids, he claims, is a delusion.

The loss of blood at the time of operation is so small as hardly to merit notice ; though perhaps in this respect it must give precedence to the ligature and clamp ; but so far as secondary hæmorrhage is concerned, the risks are unquestionably less. He states that he has now operated upon more than three hundred patients, without a death, a single instance of secondary hæmorrhage, or one case where any complication, such as ulceration, abscess, stricture, or incontinence of fæces has occurred ; and further, that, to the best of his knowledge, every patient has been completely and permanently cured.

The following is his description of the method of performing the operation :

1. The patient, previously prepared for the operation and under the complete influence of an anæsthetic, is placed on a high narrow table in the lithotomy position, and maintained in this position either by a couple of assistants or by Clover's crutch.

2. The sphincters are thoroughly paralyzed by digital stretching, so that they have no "grip," and permit the hæmorrhoids, and any prolapse there may be, to descend without impediment.

3. By the use of scissors and dissecting forceps, the mucous membrane is divided at its junction with the skin round the entire circumference of the bowel, every irregularity of the skin being carefully followed.

4. The external and the commencement of the internal sphincters are then exposed by a rapid dissection, and the mucous membrane and attached hæmorrhoids, thus separated from the submucous bed on which they rested, are pulled bodily down, any undivided points of resistance being snapped across, and the hæmorrhoids brought below the margin of the skin.

5. The mucous membrane above the hæmorrhoids is now divided transversely in successive stages, and the free margin of the severed membrane above is attached, as soon as divided, to the free margin of the skin below by a suitable number of sutures. The complete ring of pile-bearing mucous membrane is thus removed.

Bleeding vessels throughout the operation are twisted on division.

It is better to commence the separation of the mucous membrane from the skin at the lowest point and deal with the two sides in succession, before completing the circle above, so that any oozing that may occur shall be below the work as it proceeds. The incisions must be made through the mucous membrane and not through the skin. It is very important that no skin should be sacrificed, however redundant it may appear to be, as the little tags of superfluous skin soon contract, and eventually cause no further inconvenience. If this precaution be taken there is no fear of stricture.

The attachment of the mucous membrane and piles to the sphincters is so slight that the closed scissors as a raspatory, or the fingers, will suffice for their separation.

The firmest adhesions are always found at the highest and lowest points where the fibres of the external sphincter converge. With a very little patience the whole of the hæmorrhoid plexus can be isolated and the membrane drawn down, leaving the external sphincter almost bare and cleanly dissected. Up to this stage of the operation there is practically no hæmorrhage, for, as is well known, the arteries which supply the rectum run immediately beneath the mucous lining, and not in the loose tissue separating it from the sphincters. They are, however, necessarily cut in the next step, which consists in the transverse division of the mucous membrane just above the piles. To prevent hæmorrhage it is advisable to cut through the bowel by degrees and to twist each bleeding vessel as it is divided. After securing the vessels, before making any further incision in the bowel, attach the free edge of the piece of mucous membrane first divided to the corresponding portion of skin at the verge of the anus. This procedure is repeated until the entire circumference of the bowel is secured to the skin. By this means healing by first intention will be insured.

The arteries met with are exceedingly small, easily seized, and only require a few twists of the forci-pressure forceps to prevent both immediate and secondary hæmorrhage. Ligatures may slip off, be torn off by the first action of the bowels, or ulcerate through before the vessel is occluded, but torsion never fails.

Before the wound is closed iodoform should be insufflated between the raw surfaces. The stitches used in suturing the membrane to the skin need not be taken out as they will come away spontaneously in due time.

Whilst the patient is still on the table, introduce into the rectum a suppository containing two grains of extract of belladonna, give the external parts a final dust with iodoform, and place over all a strip of oiled lint, which is retained in position by a T-bandage.

For the first few days, with highly neurotic patients, keep a bag of ice in close proximity to the rectum, administer a dose of castor-oil on the fourth day. The patient sits up on the fourth day, and is in a condition to resume work within a fortnight.

Patients rarely suffer much pain after the operation, though this de-

pendes chiefly on the nervous susceptibility of the individual. Some aching in the back may be complained of, as in pelvic operations, but this is generally relieved by change of posture. If the change of posture does not answer, a hot water-bag or hot salt applied to the back will generally give immediate relief.

Retention of urine occasionally follows, and sometimes it will be found desirable to use a catheter. This complication, however, is met with less frequently after excision than after any of the other operations which aim at the same result.

The very unreserved manner in which Mr. Whitehead commends this method of dealing with piles will undoubtedly induce its adoption in many cases by other surgeons. Reference to the report of hospital work by Dr. Weir, of the New York Hospital (see page 515 of this number) will show however that the same good results will not always be obtained by others as are reported by the Manchester surgeon. The number of operations reported by the latter, over three hundred, will strike one as singularly great. One cannot help think that a considerable proportion of them would have been successfully relieved by less heroic measures, such as carbolic acid injections, in the hands of American surgeons. In the more aggravated cases, in which the method by injection is insufficient, and the choice of procedure must be made, between ligation, the clamp and cautery, and radical excision, there is much in the reasoning and experience of Whitehead and Lange to commend the method by excision to trial.

L. S. PILCHER.

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KROENLEIN ON THE OPERATIVE TREATMENT OF ACUTE DIFFUSE PUTRID-PURULENT PERITONITIS.<sup>1</sup>

On the basis of an address two years ago, including three operative cases of his own, and the publication of Mikulicz (*Volkmann's Sammlung*, No. 262, Dec., 1885) who had independently followed a similar line of thought, Prof. Krönlein, of Zurich, enters a plea for active interference in the class of cases indicated by the title above.

<sup>1</sup>Archiv. f. klinische Chirurgie, 1886, Bd. 33, Hft. ii.



Since the supposed exceptional vulnerability of the peritoneum has been disproved and the abdominal cavity been found to react to air like other cavities, one abdominal organ after another has been included in the realm of operative surgery.

Only ten years ago G. Wegner (Fifth German Surgical Congress, 1876) remarked that he and his contemporaries had doubtless all been reared in the fear of the Lord and the peritoneum—but could then add that the peritoneum had ceased to be a surgical “*noli me tangere*.”

Though, said Wegner, the chances of wound-treatment here are under normal conditions so unusually favorable, though the peculiar arrangements of this cavity prevent an otherwise unavoidable suppuration and putrefaction, yet should pus or ichor penetrate the peritoneal sack from outside or develop therein from unusual circumstances, the picture is quite reversed. In this case the wound loses its benign character, and in most cases becomes vitally dangerous. Wegner attributed the chief importance in such cases to the rapid absorption of putrid fluids by the enormous serous surface and the consequent blood-poisoning. The enormous absorptive power of the peritoneal cavity here dominates the whole scene. In contrast to the danger of fatal septicæmia the secondary peritonitis in such intraperitoneal putrefaction, suppuration and fæcal extravasation is rather in its action accessory, and in its nosological significance much less prominent.

Clinical observation tends to fully support these deductions of Wegner—mostly from experiment—since these exudations are far more dangerous than analogous ones into other body-cavities, producing septic infection with a rapidity unequalled in any other part of the organism.

As to whether diffuse suppurative peritonitis is ever recovered from is difficult to answer. The diagnosis may lack proof, and an explorative aspiration is inadmissible where the exudation lies behind intestines or mesentery. It is certainly one of the severest acute diseases, and when from perforation or rupture, admits only in the rarest cases any hope of recovery. Such being the case, it was natural that in this era of abdominal surgery operative treatment should be suggested and essayed.

It was natural that in those cases of diffuse septic peritonitis following an operation, as laparotomy, the operator should reopen the wound, clear out the exudation and disinfect. There the diagnosis is usually clear, the prognosis bad unless something is done. In a few such cases the results achieved by Keith, Wells, Tait, Peaslee, Schröder, and others have been sufficiently encouraging to warrant imitation. A step further in the same line is the operation for sudden so-called idiopathic and perforative peritonitis. The credit of applying the modern rules of oncotomy as expressed by the axiom, "Ubi pus, ibi evacua," to the purulent and putrid-purulent exudations in these forms of peritonitis he gives to very recent times—this without ignoring the work done in former periods. Past efforts have been directed either to the relief of a symptom, as in aspiration of accumulated fluid, or to the discharge of encapsulated pus after the inflammatory stage had been successfully withstood.

The dangers of active interference are very great. The quick, deep collapse and the enormous prostration of the patient, the difficulty of an exact diagnosis—whether spontaneous or perforative peritonitis, or acute intestinal occlusion (ileus)—the complicated topographical relations of the abdominal cavity, the adhesions and inflation of intestinal loops, the multilocular dissemination of the exudation between intestines, mesentery and lower pelvis, and finally the difficulty or perhaps impossibility of finding and closing an existing perforation, all these it must be acknowledged make the prospect of success from an operation *a priori* very small. On the other side, however, this is overbalanced by the imminent danger to life.

In 1882 E. Rose, according to Leyden, operated unsuccessfully in a case of diffuse peritonitis. In 1883 Tait advocated laparotomy and was able to record some success. In one of Mikulicz's cases—laparotomy three days after perforation—a cure resulted. Krönlein relates three cases with one success.

1. Vigorous blacksmith, æt. 17. Suddenly attacked with pain in ileo-cæcal region, obstipation, vomiting—from the second day of fæcal matter, etc. The diagnosis lay between perforative peritonitis and intestinal occlusion. Collapse. Laparotomy on third day. Incision

in linea alba. Small intestines distended, hyperæmic and covered with a thin fibrinous layer. Omentum, intestines, etc., lightly adherent to a pus cavity in right iliac region. A band of omentum seemed to have compressed the lower end of the ileum and thus perhaps have caused the ileus. The fæculent pus was removed, the cavity sponged with  $2\frac{1}{2}\%$  carbolic and the drawn out loops of intestine next the pus washed with like solution. The perforated vermiform appendix was doubly ligatured, as also a bit of mesentery. After thorough cleansing of all parts the abdomen was closed without drainage. The patient slowly reacted. No further vomiting, no evacuation of bowels, no fever. Death from collapse a little over two days later. This he believes to have been the first case of resection of the vermiform during the acute stage of peritonitis.

2. Diffuse putrid-suppurative peritonitis. Laborer, æt. 18. After eating freely of cherries—swallowing the pits—he was attacked by griping and vomiting. Symptoms of peritonitis gradually developed. Obstipation. Great tympanites. Special sensitiveness to left of umbilicus below which latter there was some dulness. Finally, vomiting of fæculent material and severe prostration. Laparotomy on 9th day. Incision from umbilicus to symphysis, the wound edges gaping wide and intestines filling the opening. These were highly injected and coated with fibrinous material. A fæculent stench rose from the cavity and sanguino-serous fluid flowed off. Exudated material was found everywhere on separating adhesions, in some places thick pus, in others sero-fibrinous fluid and again, notably in pelvis and dependent spaces, putrid fæculent matter. No occlusion nor perforation, and not even the vermiform itself could be found. Despite the apparent hopelessness he carefully washed out and wiped off the exudation with  $\frac{1}{20}\%$  of bichloride. The wound was closed by deep lateral and superficial sutures. No drainage. Duration of operation one and one-fourth hours. Ether had to be repeatedly injected meanwhile. No further spontaneous vomiting. Milk and wine could be retained by the second day. Bowels moved on the third day. From 4th to 14th profuse stinking diarrhœa, but free from pus. Improvement, however, continued. Great hunger; full diet after fourth week. In perfect health when seen three and a half months later.

3. Workman, æt. 67. Sudden attack. Laparotomy on 5th day without narcosis. A perforation was found in the jejunum and the usual condition in perforative peritonitis. The opening was closed by Lembert's sutures and the general cavity cleansed and disinfected with  $\frac{1}{20}\%$  of bichloride. Death the following night. A couple of smaller ulcerations were discovered at the autopsy, but their nature remained uncertain—neither typhoid nor tubercular.

Krönlein's first operation was in February, 1884, the other two in 1885.

WM. BROWNING.

# INDEX OF SURGICAL PROGRESS.

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## GENERAL SURGERY.

I. On the Occurrence of Micro-organisms in Operative Wounds Under Antiseptic Dressings. By Dr. A. BASSOWSKI (Cracow). A series of investigations carried out at Mikulicz's Clinic are here reported. The previous observations of Rosenbach, who also worked after Koch's methods, that three principal forms—staphylococcus pyogenes aureus, albus and streptococcus pyogenes—are regularly found in suppuration, either alone or together, have been corroborated by various later observers. B. thus examined some fifty cases of acute suppuration in various organs without finding other organisms than those described by Rosenbach and not even R.'s micrococcus pyogenes tenuis. Other forms were only found in abscesses with putrid pus, near mouth or intestine. It was *apriori* probable that in primary union of wounds free from suppuration none of these organisms would occur. Still it has long been known that micro-organisms did occur even in aseptic wounds, and to determine these was B.'s endeavor. For this purpose he examined fifty wounds which presented conditions favorable to primary union, complicated wounds and those near natural orifices being excluded. The wounds had been well washed with carbolic (3%) and put up in iodoform dressings. Only these were classed as strictly aseptic where entire primary union occurred without a drop of pus even later around a suture. The material for examining he took from the drains, making flat cultures at first and secondarily pure cultures in tubes. The wound secretions were also suitably stained and examined.

Since beginning his work very similar results have been published by Stähli (Dissertation from Socin's Clinic in Basel, 1886).

B.'s final conclusions are: (1) Under antiseptic iodoform dressings

only a part ( $\frac{1}{5}$ ) of the wounds remain quite free from micro-organisms. In another portion (about  $\frac{1}{6}$ ) non-pathogenic organisms are present. All of these give perfect primary union. (2) In a larger proportion (about  $\frac{1}{2}$ ) the staphylococcus albus is present. Nevertheless a primary intention results in about  $\frac{2}{3}$  of these, a limited slight suppuration occurring in the others. (3) In nine cases the staphylococcus aureus and in two the streptococcus pyogenes occurred. Both cause certain suppuration, but by suitable drainage from the start this may be limited to the vicinity of the drain openings.—*Wien. Med. Woch.* 1887. Nos. 8 and 9.

WM. BROWNING (Brooklyn).

**II. Cases of Tetanus Following Local Frost-Bite.** By Dr. PAUL WAGNER (Leipsic). Gueterbock asserted in a recent article<sup>1</sup> that tetanus was a rare complication after frost-bite, contrary to general opinion, and could only find fifteen cases represented in literature which he analyzed and commented upon.

Partly to prove that his conclusions did not hold good in respect to the patients treated at the Leipsic Hospital, and partly also to encourage other observers to publish their cases, the author gives five new cases of tetanus occurring after frost-bite, and adds some general remarks of extreme interest.

During seven years and a quarter 164 cases of local affections due to cold were treated at the Leipsic hospital, and of these five were complicated with tetanus, making a percentage of 3.4. In the same period 23,770 patients were treated in the surgical ward in all, and 15,540 after subtraction of the skin, and genito-urinary affections. Of these 15 patients were attacked with tetanus, so that a percentage of 0.096 results for general surgical injuries. Fully one-third then, of all cases of tetanus occurring in the Leipsic hospital were due to frost-bite, or  $33\frac{1}{3}$  per cent. The cases are as follows:

1. Laborer, æt. 33 years. Right foot swollen, red. Toes black, covered with vesicles; admitted November 14. Nov. 22, pains in muscles of lower jaw. Nov. 21, opisthotonus. T.  $37.8^{\circ}$ , P. 72, R. 20.

<sup>1</sup>Vide *Annals of Surgery* Vol. 2, p. 499.



Contraction of recti. Nov. 24, suffocatory paroxysms. After one of these, lasting two minutes, death. Treatment, acid salicylic in large doses, morphine. Post-mortem, wounds granulating; nerves of lower extremity, brain and medulla normal.

2. Laborer, æt. 27 years. Froze his hands while loading stones. Finger tips had turned black and the skin fallen off. Admission two weeks afterwards, with trismus. In the evening and next morning respiratory cramps. T.  $39.5^{\circ}$ , P. 172. Death. Treatment, morphine in large doses. Post-mortem, gangrene of fingers; line of demarcation middle of second phalanx. Nothing abnormal in the nerves, spinal marrow or brain.

3. Weaver, æt. 60 years. Gangrene after frost-bite of toes of one foot. Admitted Feb. 8. Feb. 28, trismus, tetanus. March 2, death. Post-mortem revealed normal condition of nerves, cord and brain.

4. Laborer, æt. 49 years. Both feet frost-bitten, bluish-red, swollen. Admitted October 26, with contraction of masseters and temporals, of muscles of neck, back, abdomen and lower extremities. Difficulty in swallowing. On following days improvement. T.  $39.5^{\circ}$ , P. 100, R. 30. Lower extremities still stiff. Nov. 5, weakness; delirium, Nov. 6, death from debility. T.  $40.2^{\circ}$ . Lobular infiltration of lower portion of lungs. Normal condition of nervous system.

5. Laborer, æt. 20 years. Slightly frost-bitten toes. Admission after five weeks, Feb. 17. Contraction of muscles of side of face, of neck, abdomen, back and lower extremities. Urine 600 gm., density 1030, contains no albumen. Feb. 20, urine contains  $\frac{1}{4}$  albumen, granulated casts, hæmoglobin. T.  $39.0^{\circ}$ , P. 135. Debility of heart Feb. 21, collapsed condition. Death. Treatment, salicylic acid; morphine. Post-mortem, pericardial petechiæ, endocardial and pleural and mediastinal hæmorrhages. Cerebral pyramids pale, no hæmorrhagic foci in brain or cord.

The author explains the rarity of the occurrence of tetanus after frost-bite of the hands and fingers by pointing out that the hands are never so severely frost-bitten as the feet.

His cases also prove that tetanus may occur even when the damage done by the cold is not excessive. The time when tetanus first ap-

peared varied from four to thirty days. Contraction of the muscles of the upper extremity was not observed, nor had it ever been observed in the Leipsic clinic (Prof. Thiersch). Hæmoglobinuria has never yet been observed to the knowledge of the author, and is explained by attributing it to the effect of the same infectious matter which causes tetanus.

The author laments that no treatment has as yet been found which could effectually combat the disease. Amputation, opium, morphine, chloral, salicylic acid and curare (the latter in large doses, continued till respiratory paralysis ensued) had all been tried and discarded.

In the text casual mention is made of a number of other unpublished cases of tetanus.—*Deutsch. Zeitschr. f. Chir.* Bd. 23. Hft. 5 and 6. June 1886,

W. W. VAN ARSDALE (New York).

## OPERATIVE SURGERY.

**I. Socin's Method of Removing Tumors of the Thyroid by Intraglandular Enucleation.** By R. F. WEIR, M.D. (New York). As complete extirpation of the thyroid in case of tumors of that gland involves danger of consequent myxœdema, Socin of Basel has called attention to the fact that in most cases the new growth of thyroid tissue or neoplastic elements can readily be separated from the normal gland tissue; to do this, it is only necessary to cut through the overlying stratum of healthy thyroid tissue until the capsule of the tumor is reached, when enucleation can be easily accomplished; the divided gland tissue might give rise to considerable venous oozing, but this is easily controlled. Socin's experience now embraces over fifty cases without any subsequent cachexia. In case of a dwarf, æt. 21, mentally deficient and presenting the appearance of commencing myxœdema, an enlarged irregular thyroid gland had existed from infancy on the left side of the neck; on the right side, no general enlargement was felt or seen, but, nearly on a level with the larynx, was a roundish movable tumor—afterward found to be adenomatous—of the size of a hen's egg, which had appeared within the past eighteen months, had caused considerable pain on that side of the head, and had also been

increasing in size and moved with the trachea in swallowing. Declining to extirpate the entire gland, Dr. Weir made a vertical incision over the tumor and cut through the gland substance of a deep red color to the depth of more than a quarter of an inch until the tumor was exposed freely, and with the end of the scalpel and the finger nail, an hour-glass shaped growth, two inches long and three-fourths of an inch wide, was promptly enucleated. The venous oozing from the substance of the thyroid gland was easily checked by clamps and ligatures and the cut edges stitched together, except at the lower edge, where a drainage tube was inserted, and then the cutaneous incision was sutured in a similar manner; primary union resulted.—*N. Y. Surgical Society*, December 8, 1886.

JAMES E. PILCHER.

#### VASCULAR SYSTEM.

**I. Subcutaneous Injury of the Popliteal Artery.** By DR. CONRAD BRUNNER (Zurich). The author gives four cases of rupture of the popliteal artery due to injury, observed at the surgical clinic at Zurich under Rose and Krönlein.

*I. Rupture of popliteal artery by anterior dislocation of tibia. Gangrene of foot and leg.* A laborer, æt. 44, while felling trees, was hit by a falling fir-tree, seventy feet in length, on the anterior aspect of the thigh. Rapid swelling of the knee and leg ensued. On the following day he was admitted into the hospital, where dislocation of the tibia was diagnosed and treated by reduction and application of plaster-of-Paris bandages. There was no pulse present in the popliteal, tibialis posterior, or dorsalis pedis arteries, and sensibility of the first and second toe was greatly diminished.

Gangrene ensued in eleven days; with demarcation below the knee-joint one month later. Amputation of the thigh. The course of wound-healing was delayed for nine months owing to necrosis of the bone of the stump which ensued.

*II. Rupture of popliteal artery by antero-lateral displacement of tibia. Gangrene of foot and leg.* Strong man was shovelling earth dug for a foundation, and standing with his knees bent, when he was

hit by a mass of falling earth upon the thigh, and was buried up to the neck. He was immediately pulled from underneath, and a surgeon was called, who found the right tibia luxated to the inner side and to the front, and immediately replaced it. He was taken to the hospital where it was noticed that no pulse could be felt at or below the knee, and loss of sensibility of the foot was found complete.

After twenty-two days demarcation had occurred. Exarticulation at the knee-joint was done soon after with good result.

III. *Gangrene of foot after rupture of popliteal artery caused by hyperextension.* Boy, æt. 18 years, was walking alongside of a load of hay and trying to steady it with his pitch-fork, as it was in danger of falling over, owing to the unevenness of the ground. In spite of his efforts, made by pushing with his fork against the hay, his knees being in an extremely forced extended position—the wagon capsized, throwing him headlong on the turf, but not falling upon him. Immediately afterward, the boy felt a sharp pain in the hollow of the right knee, the skin over which was very tense. On the third day the whole extremity was swollen. The toes were black and shrivelled on the eighth day, and the patient was brought to the hospital. Demarcation was marked after six days, an abscess of the calf was incised, and, after four months, amputation of the leg was performed just below the upper third. The wound healed by primary intention.

IV. *Rupture of popliteal artery. Gangrene of right leg.* Man, æt. 27 years; had injured his knee while exercising at the gymnasium, but had quickly recovered; five weeks later a swelling developed below the middle of the thigh, which had remained ever since, the size of a child's fist.

Ten years later, while driving a cart, sudden pain attacked him at the knee, and after two days gangrene of the foot set in.

Brought into the hospital, the diagnosis was here made of aneurism of the popliteal artery, embolism with gangrene of the leg. This diagnosis having been verified by dissection, amputation was done five ctm. above the condyles of the femur, the infiltration extending up to this point. Primary union.

The author gives short abstracts of further cases of rupture of the

popliteal artery after luxation published by Malgaigne, Hamilton and others, and adds some epicritical remarks concerning his new cases. He believes the symptoms of his first three cases to be due to the formation of a diffuse traumatic aneurism (after Wahl), and explains the gangrene after Jansen, by attributing to the hæmorrhagic infiltration the compression of such vessels as would otherwise have enabled collateral circulation to be established. He agrees with Jansen that the indication in recent cases is to ligate the ruptured artery *in situ*.

In the fourth case the author believes a circumscribed traumatic aneurism to have been present; the gangrene he explains by embolism.—*Deutsch. Zeitschr. f. Chirg.* Bd. 25. Hft. 1, 2. Dec. 8. 1886.

W. W. VAN ARSDALE (New York).

**II. Aneurism of the Innominate Artery Treated by Ligature of the Carotid and Subclavian.** By CHARLES MCBURNEY, M D. (New York). An Irishman, æt. 35, probably syphilitic, had noticed a tumor on the right side of the neck just above the inner end of the clavicle; a week later he became hoarse, and in two weeks could only speak in a whisper. The tumor was evidently aneurismal, and was considered to affect the innominate artery and probably to involve the commencement of the carotid and subclavian arteries: pulsation was very marked, and was readily felt to affect the upper end of the sternum and the inner end of the clavicle and the first two intercostal spaces. Five weeks later, the tumor was found to have grown decidedly, measuring  $3\frac{3}{4}$  inches transversely, and extended to a point a little above the cricoid cartilage, displacing the trachea to the left. The tumor increasing in spite of rest in bed and the administration of ten grains of iodide of potassium three times a day, four days later a catgut ligature was applied to the carotid in its upper portion and another to the third part of the subclavian; pulsation in the tumor almost entirely ceased. A month later the patient was put on strict diet according to Tufnell's plan, and was kept in bed for a couple of months longer, since which time he has been about the ward and has taken ordinary diet. Nine months after the operation, the tumor has steadily diminished in size and is now considerably less than one-

fourth its original size, the wall of the sac being thick and firm; the voice is only slightly hoarse.—*N. Y. Surgical Society*, Jan. 12, 1887.

**III. Wound of the Internal Jugular Vein.** By JAMES BELL, M.D. (Montreal). A man, æt. 30 years, fell from a ladder driving a chisel into his neck about one inch behind the angle of the lower jaw and profuse hæmorrhage resulted. Compression of the common carotid appearing to arrest it somewhat, that artery was tied but without benefit. The wound was enlarged to find the bleeding point, but the hæmorrhage was so profuse that the search was ineffectual, although the blood seemed to come from a point near the base of the skull which could be felt with the finger in the wound. The bleeding was finally controlled by inserting three carbolized sponges well dusted with iodoform and binding them firmly down; one of the sponges was removed on the tenth day, another on the seventeenth day and the third after a month. Immediately after the accident, the man could not speak nor swallow. There had been no suppuration during the case, but the man had still a hoarse voice and some difficulty in swallowing, together with contraction of the right sterno-mastoid and contraction of the right pupil. The injury was believed to be a wound of the internal jugular vein near the point where it emerged from the jugular foramen, together with some injury to the right pneumogastric nerve with, at the same time wound, of the sympathetic trunk of that side as shown, by the myosis and a slight blepharoptosis.—*Montreal Medico-Chirurgical Society*, Jan. 14, 1887.

## HEAD AND NECK.

**I. Cancer of the Tongue.** By F. LANGE, M.D. (New York). A vigorous and otherwise well-preserved man was afflicted with a cancer, originating from the fold between the margin of the tongue and the floor of the mouth on the right side and, though not presenting much superficial ulceration, it had infiltrated the soft parts toward the base of the tongue and in the suprahyoid region with glandular infiltration along the large vessels of the right side. The first symptoms had appeared about four months previously, and the main source of



trouble to the patient was a continuous abundant salivation. The exposure of the parts required resection of a portion of the inferior maxilla and the right half of the hyoid bone, by which free access to the diseased parts was obtained and the affected tissue removed down to the epiglottis and hyoid bone. The mucous membrane of the left half of the floor of the mouth had been preserved, and was then united to the mucous membrane of the external surface of the removed alveolar process; the tension presented required the further removal of the ascending portion of the maxilla and at this time, owing to the unavoidable manipulations of the removal and probably the irritation of the intra-maxillary nerve, a sudden deterioration of the pulse and appearance of the patient was observed. The external wounds were left open and loosely packed with iodoform gauze awaiting a secondary suture. The patient rallied well, but on the following day died suddenly; in the absence of an autopsy, the cause of death—possibly acute pneumonia or nephritis—remains unknown. In a similar case, the operation could be facilitated by preliminary ligature of both external carotid arteries, thus avoiding the hindrance caused by the ligature of many bleeding vessels. The tamponade of the trachea should also be kept up for some time after the operation.—*N. Y. Surgical Society*, Dec. 22, 1886.

**II. Partial Excision of Larynx for Epithelioma. Recovery.** By LENNOX BROWNE, F. R. C. S., Ed. (London). Male, æt. 61 years. Operated December 15, 1886. Tracheotomy between second and third rings, with introduction of Hahn's tampon-canula (a tube surrounded by compressed sponge). After twenty minutes for expansion of the sponge tampon, the median incision was extended from just above the tracheal opening to the lower margin of the hyoid bone, and all the tissues were carefully divided on a director until the thyroid cartilage was reached. The soft parts over the thyroid and cricoid cartilages were rasped sub-perichondrially, the raspatory being kept so close that the perichondrium was literally peeled away from the cartilage, whilst its relation to the superficial soft parts remained undisturbed. The separation was carried back by this means as far as the

median line of the boundary between the larynx and pharynx; no scissors, knife, or other instrument than the raspatory was used. No horizontal incision over the hyoid bone, the vertical one proving amply sufficient, but part of the hyoid attachment of the thyro-hyoid muscle was severed; the much ossified thyroid cartilage was then divided by cutting forceps along its centre; the wings were separated by retractors, and the growth was seen to be confined entirely to the left half of the larynx, which portion it was decided to remove.

*Laryngectomy* was effected by (*a*) further careful and thorough separation of the attachments to the pharynx by raspatory, knife-handle, and finger-nail; (*b*) division of the thyro-hyoid membrane, as close as possible to its thyroid attachment; (*c*) division of the left superior horn of the thyroid cartilage at its root by cutting pliers; (*d*) division in the median line of the cricoid cartilage, before and behind, with pliers; (*e*) the divided half of the larynx was then separated from the first ring of the trachea, and a few nicks only were necessary to remove it entire.

The following points regarding the operation are worthy of note. Hæmorrhage, the extent of which is usually described as serious, was, in point of fact, quite trifling; only two small vessels required torsion in the second stage of the operation. Not only were no vessels searched for, as recommended by most writers, but none of any size were exposed, this happy circumstance being doubtless due to the use of the raspatory in preference to scalpel or scissors, and also to keeping so close to the cartilage. The soft parts were little disturbed in consequence. The slight oozing which ensued after the removal of the diseased portion of the larynx was checked by a slight application of the galvano-cautery along the margin of division. This procedure was also adopted for the purpose of destroying any possible fragments of diseased tissue not removed. The left ary-epiglottic fold was divided close to the cartilage of Wrisberg, and the thyro-hyoid membrane close to its thyroid attachment, with the view of impairing as little as possible the action of the epiglottis. The success of this plan was completely shown in the ease with which deglutition was effected three days later.

The dressings of the wound consisted in dusting with iodoform for two days, and packing with corrosive sublimate gauze. On the third day, iodol was substituted for iodoform, and within the week this was discontinued, the sublimate gauze only being used. All dressings, except adhesive plaster, were dispensed with after the thirteenth day.

The progress of the case was, till the eighth day, characterized by no event except of a favorable nature. The temperature rose to  $101^{\circ}$  Fahr. on the night of the operation, but after that it was hardly a degree above normal. There was slight bloody expectoration for twelve hours, and some slight pulmonary congestion and bronchitis; but the patient was cheerful, and at no time was pain complained of. The indications of pulse and respiration being equally favorable, the tampon-canula was removed in thirty hours, and an ordinary tracheotomy tube substituted: this was also removed at the expiration of seventy-two hours, and the patient breathed freely through the natural passages.

Up to this time liquid nourishment had been administered night and morning, poured from a jug into an cesophageal tube, with a funnel orifice. The food consisted of one pint of beef-tea, two eggs, two ounces of port wine, and two grains of Bullock's pepsine powder for each meal. The only discomfort experienced by the patient was that of thirst, which was allayed by small portions of ice; but, until the third day, he was not allowed to drink any fluid by the mouth. Seventy-eight hours after the operation, the patient was ordered a mutton chop to eat, according to the treatment of Hahn, who, for obvious reasons, recommends solid food as the first to be given by the mouth. The patient was able to sit up in bed, cut up his food, and eat it with relish. During all this time the weather had been very unfavorable, and early on the morning of the eighth day, which was exceptionally raw and cold, the patient's breathing became difficult and laboured, the temperature rose from  $99.4^{\circ}$  to  $101.2^{\circ}$ , the pulse from 100 to 112, and the respiration from 20 to 32. Unfortunately, the nurse, although recording these observations, did not recognize their importance, and the patient was not seen until this change had lasted over two hours. He was then found to be breathing with much difficulty and distress;

respirations and pulse were hardly to be counted, and the condition was one of alarm. It was evident that the upper air-passages were blocked, and though some benefit resulted from the introduction of a feather into the trachea, Mr. Lennox Browne decided to re-insert the tracheal tube through the original opening in the windpipe, which, happily, had not closed. Mustard and linseed poultices were applied to the chest, and steam constantly generated in the ward. The state of the patient was for two or three days one of great anxiety, but afterwards all again went well. On Christmas Day, the eleventh from the operation, he had turkey and champagne for dinner, and from that date convalescence was uninterrupted. He "got up" for the first time on the seventeenth day after operation. The tracheal tube was removed on the twentieth day, that is, on January 3. His weight was then 148 lbs., being a loss of 12 lbs. since the operation.

January 17, that is, the thirty-fourth day, tracheotomy-wound quite closed, but, though ample granulation has taken place, union of the upper portion is incomplete. This is due to the fact that, in consequence of inability to keep the edges of the soft parts whence the cartilages were removed on a level with those so supported, the skin on the left side has become inverted. For the rest, the patient speaks with a wonderfully good though rough voice.

JAMES E. PILCHER (U. S. Army).

**III. First Case of Cure of a Larynx Cancroid by Extirpation per Vias Naturales.** By Prof. B. FRANKEL (Berlin). The patient was Prof. Wiggers, of Rostock, a member of the German Reichstag. Treatment was begun in 1881, when he was 70 years old. A bean-sized growth was situated on the middle of the right vocal cord. In September, 1881, this was removed with the (wire) loop and a galvano-cautery applied to the base. Microscopic examination proved it to be an epithelial cancer. A year later F. similarly removed a recurrent growth from the front end of the former location. Another bean-sized recurrence was removed piecemeal the end of May, 1883. In February, 1884, a much broader local relapse was removed with loop and forceps. This was denominated a cancroid by Virchow. By this time a hard gland, size of a hen's egg, had also developed be-

neath the sterno-cleido. Madelung, of Rostock, successfully removed this, several smaller glands and a 5 ctm. piece of the involved common jugular. Primary union without recurrence from these secondaries. However, it had appeared again in the larynx by June, 1884. This was also removed through the mouth, but instead of using the loop as a cutting instrument, he allowed it to grasp the growth firmly and then tore it off. In two sittings the broad base was extirpated. Since he had meanwhile become impressed with the ill effect of the thermo-cautery on carcinoma it was not applied this time. Since this last operation nearly two years had elapsed with no recurrence. A cure had finally been effected in a person of 75 years, and with the preservation of a loud, clear voice. In the only previous like attempt that he could find (Oertel's) the tumor did not prove to be an epithelioma.

The seat and extent of trouble set limits to this method. Now it will, of course, be greatly facilitated by local anæsthesia.—*Arch. f. klin. Chir.*, 1886, Bd. 34, Hft. ii.

## ABDOMEN.

**I. On the Operative Treatment of Intestinal Invagination.** By Prof. H. BRAUN (Jena). The number of these cases seen by even an experienced observer usually remains small, hence the greater reason for collective comparison. The older collections of Ashhurst (1874, 13 cases), Sands (1877, 21 cases) and Widerhofer (1870) are too small, and the newer ones of Saltzmann (1882, 29 cases), Beklewski (1883, 29 cases) and Schramm (1884, 26 or 27 cases) he considers lacking in detail. He does not essay the general subject of treating internal intussusception but only the operative side.

A case of his own is first given. It was in a boy of 3 months. The first couple of days all kinds of bloodless means were tried unsuccessfully. Laparotomy on the fifth day. In attempting to draw out the invaginated part it ruptured. Exsection with suture of the gut was then performed. Death an hour later. It proved to have been an

ileo-colic invagination—the worst form to reduce. He calls attention to the folding up of the sheath or external gut layer, in his case the neck-forming colon. This was so great that 3 or 4 ctm. on being straightened out equalled 25, and the 20 ctm. long resected part made an 80 ctm. long piece. The frequent increase and decrease of pain, the change in length and position of the tumor, its partial reduction by injections of water are all thus intelligible, the peristalsis forcing together and relaxing the folds without necessarily changing the invagination.

As soon as vomiting and alveolar obstipation appear in the course of acute or chronic invagination and ordinary means, as rectal injections, insufflation of air, etc., do not speedily relieve we are compelled to resort to operative procedures. Of course distention by fluids introduced per rectum is only admissible in the early stages before gangrene on the one hand or firm adhesions on the other have developed. The great mortality of invagination in general is an incentive to operate. Leichenstern (1873) gives the death-rate for the first six months of life as 88%, for the second as 82%, for the second to tenth year as 72%, and for adults as 63%. Widerhofer by collecting scattered reports obtained better figures, viz., 56% for second to fifth year, and 53% for sixth to tenth year; but this plan would evidently give over favorable proportions. Excluding cases where an invaginated colon has projected through the anus and been resected, two operative methods are available, laparotomy and enterotomy. Laparotomy is undertaken with the intention of freeing the invaginated part, through the wound (by pulling and pressing, by pushing the sheath upwards and forcing out the intussusception).

If this does not succeed we may stop further attempts, *i. e.*, leave the person to certain death, or we may resect the entire invagination, or we can open an artificial anus hoping thereby to preserve life until the invaginated part has been thrown off.

He has classified in all 63 operated cases, 18 of them German, and 20 before 1870.



<i>Operation.</i>	<i>Whole No.</i>	<i>Children.</i>	<i>Adults.</i>	<i>Cured.</i>	<i>Died.</i>
I Laparotomy for disinvagination . . .	51	30	21	11	40
1 Disinvagination successful . . . .	29	19	10	4 8	15 2
2 Disinvagination unsuccessful . . . .	24	12	12	0	24
<i>a</i> Abdomen again closed . . . .	4	3	1	0	4
<i>b</i> Invagination resected . . . .	12	6	6	0 1	6 5
<i>c</i> Enterotomy performed . . . .	9	3	6	0	9
II Enterotomy simply . . . . .	10	3	7	0	10

Successful disinvagination was thus far less able to ward off a fatal result in children than in adults. No child under six months has as yet been saved by an operation. In all cases where attempted disinvagination was not accomplished death followed despite resection (11 cases) or enterotomy (9 cases). In the one successful case of resection the gut had been freed, but a suspected neoplasm induced the operator, Czerny, to resect. Enterotomy simply, *i. e.*, without attempting reduction, was also a failure (10 cases) though some of these patients lived a few days. Three enterotomies terminating favorably he excludes as uncertain, the intussusception never coming away. From the above it follows that only disinvagination holds out any hope. That this may be successful it should be tried early, on first or second day if possible. Meteorism, peritonitis, gangrene, adhesions, etc., are then absent. Leichtenstern found that children under a year with this trouble usually died between the fourth and seventh day; when over ten years between the eleventh and fourteenth day. The reduced gut should be carefully inspected for any necrosis or tumor. Where the tumor has a broad base or malign character, resect; where pedicled and benign cut off or ligature and sew up again. In eight of his cases such complications had been found. Making an artificial anus without

previous attempt at reduction is indicated where the meteorism is so severe as to render reposition of the intestines difficult or impossible, and where the patient's general condition is so low as to forbid laparotomy.

The cases which he has gathered are first tabulated, then given *in extenso*. He appends the three other cases of enterotomy with cure, but in which the diagnosis was uncertain — *Arch. f. klin. Chir.* Bd. 33. Hft. II.

WM. BROWNING (Brooklyn).

**II. Abdominal Section for Traumatism.** By THOMAS S. K. MORTON, M.D., (Philadelphia). This paper contains a brief but complete statistical summary and a short discussion of the proper operative methods, which do not differ materially from those now generally accepted including antiseptic precautions, and contains a report of five cases, one of gunshot wound resulting fatally, two of stab wound with recovery and one each of ruptured bladder and ruptured intestine, both fatal. (1) A powerful negro, æt. 36 years, was wounded with a 32-calibre pistol bullet, an inch and a half above and half an inch to the right of the umbilicus; no shock or any marked symptom of intestinal perforation was present, except a copious vomiting of blood just before the operation, an hour and a half after the accident. An incision was made by Dr. T. G. Morton from two inches below the ensiform cartilage to the pubes, giving exit to a large quantity of fluid and clotted blood, fæces and partly digested food. Four perforations of the stomach and a linear rent of the transverse colon just before its downward curve were found, the omentum was badly torn in a number of places and filled with very large clots of extravasated blood, and a number of ecchymoses of the small intestine and mesentery were found. The stomach and gut wounds were trimmed and sutured with chromicized catgut, Lembert's sutures, one large omental rent stitched, and a badly bruised point on the gut, which appeared as if it would slough, was turned in by Lembert's sutures; the toilet of the peritoneum was performed antiseptically and the cavity closed; there was some shock, but the patient reacted well for four hours; nevertheless after five

hours he presented all the signs of hæmorrhage and died six hours from the completion of the operation. Autopsy showed a good condition of the abdominal viscera, but revealed the fact that the ball had passed from the stomach through the diaphragm and, without affecting the lung, had lodged in the seventh intercostal space, wounding the intercostal artery, which had bled a pint and a half into the pleural sac. (2) A powerfully built man, æt. 40 years, received a stab wound  $\frac{3}{4}$  inch long from a butcher's knife, 2 inches above the centre of the right Poupart's ligament. Abdominal section by a 5-inch median incision by Dr. John B. Roberts, three-quarters of an hour later, revealed six wounds. four opening the small intestine, one the colon just above the cæcum and running into the mesocolon, and one transfixing the mesentery. All were closed by Lembert's sutures and the abdomen emptied of all foreign contents and closed, the entire operation being performed under strict antiseptic precautions. In spite of an intercurrent attack of *mania a potu*, the belly healed by primary union and the patient was discharged cured on the nineteenth day. (3) A man, æt. 30 years, received a stab  $1\frac{1}{2}$  inches long, 2 inches to the right of and  $\frac{3}{4}$  inches above the umbilicus. Decided emphysema was present for a space of 3 inches above the wound. Median abdominal section, ten hours later, by Dr. T. G. Morton, revealed a rent of one layer of omentum and a divided and bleeding vessel just on one side of the tear, but no gut wounds. After ligaturing the artery and stitching the omental wound and the peritoneal opening of the external wound, and cleansing the abdomen, the cavity was closed; the patient was discharged cured in twenty-eight days. (4) A man, æt. 38 years, fell out of a second story window, sustaining a fracture of the neck of one femur and a rupture of the bladder; laparotomy was performed about eight hours later by Dr. Joseph M. Fox, through a 4-inch median incision over the bladder. A  $2\frac{1}{2}$  inch triangular rent in the anterior portion of the fundus was closed with 15 Lembert's sutures of catgut, the bladder being held up during the stitching by two long sutures passed through the sides of the rent. The patient dying in forty-two hours, the autopsy showed localized peritonitis about the wounds and blood clots in the pelvis. (5) A man, æt. 57 years, wearing a

truss for direct inguinal hernia, by which it was not kept properly reduced, was violently kicked in the groin, the hernia being down at the time. On the following day he developed symptoms attributed either to a ruptured or a strangulated gut, and preparations were made to operate for its relief on the following morning, but the anæsthetic so depressed him and his condition within the last few hours had become so bad that the operation was abandoned and death ensued in two hours. The autopsy revealed two tears an inch long in a loop of small intestine which had evidently formed the hernia, much peritoneal congestion and inflammation, and a great quantity of fluid fæcal matter in the pelvic basin.—*Jour. Am. Med. Ass'n.* Feb. 26, 1887.

**III. Cholecystotomy and Cholecystectomy.** By JUSTUS OHAGE, M.D. (St. Paul, Minnesota). This paper reports a case of each of these operations. The case of cholecystotomy occurred in a Swedish woman, æt. 42 years, who had suffered from gall-stone colic more or less of the time for the last twenty years, with greater severity, however, for the last two weeks. Impaction of a gall-stone in the ductus communis with beginning formation of an abscess, and enlargement of the gall bladder was diagnosed. Under antiseptic precautions, a vertical incision six inches long was made at the outer border of the right rectus muscle, beginning above at the margin of the eighth rib. The field of operation was found to be greatly obscured by the inflammatory changes of the past twenty years, but finally it was possible to expose the lower anterior part of an enlarged and thickened gall bladder; fearing excessive hæmorrhage, section of the gall bladder was postponed to a supplementary operation, the lower portion of the abdominal wound being left open for about two inches and packed with iodoform cotton until adhesion had taken place between it and the gall bladder. On the eighth day thereafter, firm adhesions having formed, the gall bladder was incised and about half a pint of pus evacuated and four stones removed from the sac and one from the common duct. The patient made a good recovery in three weeks, but a fistula, opening and closing at times, remains.

The case of cholecystectomy occurred in a Swedish woman, æt. 35

years, who had suffered during the previous three years from attacks of gall stone colic, with constant trouble during the preceding three months. Cholelithiasis with enlargement of the gall bladder from obstruction of the cystic duct by a gall stone was diagnosed. Under strict antiseptic precautions, an incision eight inches long was made at the outer border of the right rectus muscle, beginning above at the margin of the eighth rib, exposing an enormously distended gall bladder: a large stone could be felt in the cystic duct. Without aspirating it, the gall bladder was then detached from the liver, the obstructing stone carefully worked back into it, the cystic duct ligatured, the bladder emptied of its fluid contents by puncture, divided close to the ligature with a Pacquelin cautery, and removed with the 153 calculi which it was found to contain. The ligature was cut short and dropped into the abdomen, the wound closed and the parts dressed antiseptically. The patient reacted well, the wound healed by first intention and she was discharged on the thirteenth day. The operation seemed to have no effect upon the digestive functions. These cases are followed by a discussion of the merits of the two operations without, however, coming to a definite conclusion.—*Med. News*, Feb. 19 and 26, 1886.

**IV. The Cure of Reducible and Irreducible Hernias by Heaton's Injection Method and by Radical Operation.** By ROBERT F. WEIR, M.D. (New York). This subject is discussed in a paper of considerable length, which includes a particularly full description, with favorable comments, of Macewen's operation as described in the *ANNALS OF SURGERY*, vol. iv, p. 89, and is concluded by the following recapitulation: (1) Small, reducible and easily controlled hernias can safely be treated with Heaton's injection, and with a reasonable prospect of success—30% of recoveries. (2) In similar hernias in children, in which the use of a truss has failed, Heaton's injection is to be recommended as a particularly successful procedure. (3) In unmanageable, painful or irreducible hernias, demanding surgical interference, and sometimes those in which Heaton has failed, the radical operation should be resorted to, with the sac tucked up or tied off as the surgeon may determine, but with a high and complete suturing

of the canal. (4) Where omentum is found in a hernia, it should be securely tied and resected. (5) The wound in the region of the external ring should be healed by granulation to afford a cicatricial barrier, as an additional factor in the cure.—*N. Y. Med. Rec.*, March 5, 1887.

**V. Hernia Inguino-Peritonæalis.** By CHARLES W. DULLES, M.D. (Philadelphia). The author describes a case of strangulated hernia, which he believes to have been a case of peritonæal hernia, but his description is unfortunately so deficient in diagnostic points that the reader is unable to discover upon what he founds his diagnosis. While remarking the fact that very little attention has been paid to the subject in this country, he fails to define the condition so that the reader not familiar with the subject can understand it—the nearest approach to a definition being that peritonæal, while not fully descriptive, may be employed to describe hernias occupying unusual positions within the abdominal or pelvic wall in front of the peritoneum. The paper is valuable, however, for a résumé of thirty-three cases of the lesion.—*Med. News*, Jan. 22, 1887.

## EXTREMITIES.

**I. Operative Shortening of the Bones of the Leg in the Treatment of Injuries Complicated with Extensive Destruction of Soft Parts.** By WILLIAM D. HAMILTON, M.D. (Columbus, Ohio). After discussing the abstract on this subject presented in the *ANNALS OF SURGERY*, vol. iii, p. 525, without giving proper credit, however, the author relates the case of a girl, æt. 10, whose left leg was almost cut in two at the junction of the lower and middle third, the lower fragment being bent at right angles to the upper one; an irregularly rectangular lacerated wound,  $2\frac{1}{2}$  inches broad in the continuity of the leg and five inches long had been inflicted; in this area the soft parts were extensively destroyed to the level of the deeper posterior layer of muscles, both bones were comminuted in their whole diameter, and the periosteum was denuded from the upper tibia for three-quarters of an inch—nearly everything lying in front of a plane passing posterior to both bones being destroyed for two and a



half inches in the continuity of the leg. After checking the quite profuse hæmorrhage by tying the divided ends of the anterior tibial artery with catgut, the periosteum was well retracted, a transverse even division of the bones made above and below the injury, the intervening fragments comprising about two inches of both fibula and tibia dislodged, and neat apposition secured without wiring or suturing. The wound was closed and dressed antiseptically, and splints applied to secure immobility. Recovery was complete three months later with a little less than two inches shortening. The operation had two things in view: 1. To prevent gangrene and save the limb by inducing prompt union throughout, the idea being to remove the bone which occupied the gap and which, being the focus of inflammation, and suppuration, threatened the posterior blood and nerve supply; 2, or to anticipate a probable long siege of periostitis, ostitis, necrosis or osteo-myelitis. For several months the temperature of the limb was lowered and it had a dusky hue, its nutrition and innervation being seriously impaired by the complete division of the anterior vessels and nerves. Unlike the operation of Martel, this was a primary operation.—*Jour. Am. Med. Ass'n.*, Jan. 22, 1887.

**II. Subperitoneal Amputation at the Hip-joint after Hip Disease.** By EDWARD H. BRADFORD, M. D. (Boston, Mass.). This paper contains a table of 22 amputations at the hip-joint for hip disease, to supplement that given by Ashhurst in the *International Encyclopædia of Surgery*, showing a mortality of only 14 per cent. since 1880. A case is detailed in which the author performed the operation with a perfect result. As Lisfranc's method of disarticulation is not readily done if an elastic tourniquet is used, he recommends a method which is practically that of Furneaux Jordan. A lateral incision is made as in excision of the head of the femur, the head of the femur is excised in order that it be out of the way, the lateral incision is prolonged and the shaft of the femur separated for two or three inches in its length from the surrounding muscles, taking care that the periosteum remains with the muscles; a circular amputation of the thigh is then done, the bone sawn through, or if entirely freed from the sur-

rounding tissues by the lateral incision, pulled out from the flaps without sawing; then the vessels are tied and the tourniquet removed. He concludes: (1). Amputation at the hip-joint in hip disease should be regarded as the very last resort, contraindicated by extensive amyloid degeneration of the viscera or a moribund condition of the patient. (2). The chances of mortality are not greater than the chances given in amputation of the thigh in general. (3). The chances of a permanent cure (barring the mutilation) would appear to be greater than after excision at the hip-joint. (4). The amputation should be done subperiosteally whenever possible. An elastic tourniquet gives the best means of preventing hæmorrhage. (5). Preliminary excision of the head of the femur, in freeing the upper part of the shaft, will be found to facilitate the amputation.—*Boston Med. and Surg. Jour.*, February 24, 1887.

**III. The Osteoplastic Resection of the Foot of Wladimirow and Miculicz.** By CHRISTIAN FENGER, M. D. (Chicago). This operation has already been described in the *ANNALS OF SURGERY*, Vol. iii, p. 425, and Vol. v, p. 161. This paper gives a complete historical sketch of the operation, a full description of the operative details, its indications, after-treatment and results, with a table of the eighteen cases reported previous to the writing of the paper and a full report of a new case by the author. A man, æt. 28, had been suffering from chronic traumatic myelitis for ten years, which had produced ankylosis of the joints from the ankle to Chopart's articulation. There were fistulas leading to suppurating bone in the sinus tarsi, and an ulcerating cicatrix appeared on the posterior and lower surface of the heel. Evident upon two occasions had been followed by relapse. The Wladimirow-Miculicz operation was then performed. Healing was definite in four months. The toes being fixed in semi-flexion were two months later forcibly extended, which resulted in rupture of the skin beneath the first and second metatarso-phalangeal joints, from which an ulcerating cicatrix sprang; this was finally cured by excision of the cicatrix and transplantation of a flap from the sole of the foot. Fifteen months after the operation the patient could walk with boot.

and cane, and bear the whole weight on the foot; the ankylosis was solid. There was five centimetres of lengthening of the lower extremity on that side. The author concludes: 1. The osteoplastic resection of the foot, as devised by Wladimirow and Miculicz, has a legitimate place in the surgery of the foot. It gives functional results superior to those of the supramalleolar amputation. 2. Destruction of the soft parts of the heel is an indisputable indication for its performance. 3. In tuberculosis of the ankle joint with tarsus atypical excisions may be done, as advised by Connor and Kappeler, or Pirogoff's or Syme's operations. It is doubtful whether these operations, in cases permitting the choice, should be abandoned in favor of the osteoplastic resection. This question can be answered only after further observations have been made as to the permanent cure of the disease by the operation, the duration of its after-treatment and its final functional results. 4. The results so far recorded allow of a choice between the osteoplastic resection and the operations mentioned, for the purpose of determining its value as compared with that of older operations.—*Jour. Am. Med. Ass'n.*, January 29, 1887.

#### GENITO-URINARY ORGANS.

**I. Six Cases of Suprapubic Lithotomy.** By Dr. C. M. THOMAS (Philadelphia). CASE I. Male, æt. 67 years. Large, sacculated stone. Preliminary distention of bladder only. Stone dislodged with some difficulty from behind and to the left of the prostate, weight three ounces; soft catheter left *à demeure*; rubber drain through wound; wound granulated slowly, leaving a fine fistula which did not close till lapse of several months.

CASE II. Male, æt. 66 years. Preliminary rectal and vesical distention; stone of five drams' weight removed; suture to bladder wound and to superficial wound; inlying catheter; urine appeared at wound in thirty-six hours, when all superficial stitches were removed; urine ceased to appear after ten days; healing complete in five weeks.

CASE III. Male, æt. 47 years. Deep perineal sinuses and fistulæ. Preliminary rectal and vesical distention. Stone of 200 grains' weight. Suture to bladder wound. Flow of clear, odorless fluid from

wound on fifth day, apparently never influenced by the amount of urine in the bladder, continuing more or less profusely for ten days without causing any complication. Recovery complete in four weeks.

CASE IV. Male, æt. 70 years. Very feeble and prostrated by long suffering. Urine loaded with pus and very offensive. Bladder would not hold more than three to four ounces when injected. A long diverticulum from the bladder present; a calculus found both in this diverticulum and in the main part of the bladder. The calculus taken from the bladder proper weighed 80 grains; that from the diverticulum, 170 grains. The size of the opening into the diverticulum was so small that the stone in it could be removed only by crushing it, *in situ*, and washing out the fragments, with the patient rolled on his face. No effort to close the bladder wound. After-treatment same as in Case I. Death by asthenia on sixth day. At no time was there any sign of peritonitis, or wound inflammation, or decreased action of the kidneys. No autopsy.

CASE V. Male, æt. 63 years. Stone encapsulated behind and to the right of the prostate. Preliminary distention of rectum and bladder. No stitches except at the extreme angles of the abdominal section. After-treatment as in Case I. The inlying catheter not assisting in the drainage was removed after twenty-fours, and only introduced at intervals of four to six hours, for the purpose of washing out the bladder. Uninterrupted recovery. Dismissed healed in twenty-eight days.

CASE VI. Male, æt. 8 years. Some difficulty from the close contact of the peritoneum with the pubes. Operator was able to push this up, however, sufficiently to give room for a free incision of the bladder. Uric acid calculus, about one inch in diameter, removed. The bladder was sutured, and united *per primam*. Parietal incision lightly tamponed with gauze, which was removed on the third day. The boy was up in seven days, and was dismissed on the tenth day after the operation.

The author observes that in Cases I, IV, and V, the completion of the operation by any other method than the suprapubic would have been a matter of difficulty, if not of impossibility. The fatal result in

Case IV cannot well be traced to the method of operation.—*Trans. of the Hom. Med. Soc., Phila.*

**II. A Satisfactory Method of Early Diagnosing an Intra-peritoneal Rupture of the Bladder.** By ROBERT F. WEIR, M.D. (New York). This method consists in distention of the bladder by the injection of antiseptic fluid, the rectum having previously been dilated by Petersen's rubber bag colpeurynter limited by a silken network as described in a previous paper (*ANNALS OF SURGERY*, vol. v, page 280). In case the bladder is found to become distended and to arise above the pubis as in the normal state and the whole of the injected fluid can be withdrawn, the bladder is not ruptured. If the viscus is ruptured, the absence of these conditions will indicate the fact. A case is presented in which the absence of rupture was satisfactorily diagnosed by this method.—*N. Y. M. d. Rec.*, Jan. 22, 1887.

**III. Nephrorrhaphy and Nephrectomy.** By D. HAYES AGNEW, M.D. (Philadelphia). 1. A man, æt. 32 years, had been suffering from floating kidney consecutive to exertion while lifting, for six years, and nephrorrhaphy was performed for his relief, the kidney being exposed through the loin and stitched in the wound by means of animal thread passed through its capsule; the operation was done with strict antiseptic precautions and the patient discharged cured in twenty-five days. 2. In a little less than six months, he returned with a renewal of his old symptoms to an extremely exaggerated extent, stating that while at work, he was seized with lumbar pain and felt that the kidney had left its moorings; examination showed such to be the case. Accordingly, nephrectomy was performed by the lumbar incision, the wound closed by sutures and a drainage tube brought out at the lower angle, the whole procedure being executed under strict antisepsis, resulting in ultimate recovery, although a small sinus remained for some time until a loop of thread, supposed to be the ligature of the remaining vessels, was discharged. 3. A woman, æt. 60 years, had for nine months been suffering from a tumor in the left lumbo-iliac region, movable, sensitive to handling, and apparently about twice the size of a healthy kidney. The urine contained neither renal elements, albu-

men or blood, which caused doubt as to the organ involved (kidney or ovary) and the benignity of the tumor; on median laparotomy, however, a kidney affected with cystic disease was found. The after-symptoms of the case were good, but on the seventeenth day after the operation she was seized with severe abdominal pain, suppression of urine and death; no autopsy being allowed, the exact cause of the fatal result is in doubt, but the author inclines to cystic disease of the remaining kidney, rendering it unequal to the double duty imposed upon it.—*Med. News*, Jan. 29, 1887.

**IV. Nephrectomy and Nephrolithotomy.** By FREDERICK LANGE, M.D. (New York). A woman, *æt.* 40 years, affected with pyonephrosis, had been subjected to nephrotomy and evacuation of a large quantity of extremely offensive pus from a kidney which was as large as a child's head. The symptoms continued to be so unfavorable, however, that nephrectomy was performed a month later by the usual lumbar incision, resecting the distal ends of the eleventh and twelfth ribs, because it had been observed at the previous operation that the kidney extended high up under the diaphragm. During the operation, the peritoneum at the upper angle of the wound was accidentally torn, although the retractors were covered with flat sponges, but peritonitis did not result. A copious hæmorrhage from the large renal vessels, caused by the slipping of the ligature of the pedicle, also complicated the operation. The patient made a good recovery in spite of an intercurrent bronchitis, her condition being materially improved and the pain relieved, although the condition of the urine gave color to a suspicion that the other kidney was not entirely healthy. This was the second case in which the operator had removed one kidney while the other was not quite sound. The other patient was very comfortable, being placed under favorable hygienic surroundings in a mild European climate, but still had occasional attacks of pyelitis. From these cases, he was inclined to conclude that, when urgent symptoms were present, the extirpation of one kidney was not absolutely contraindicated by a diseased condition of the other.

In a woman, *æt.* 53 years, nephrectomy for pyonephrosis was be-



gun, but on opening the pelvis of the kidney, a hitherto unsuspected stone was discovered, only a small portion of which could be felt, the rest being firmly encysted so that it was necessary to dig it out with the aid of an elevator, a sharp spoon and forceps. The stone had a number of irregular projections which were so firmly embedded in the calices that it was by no means easy to dislodge it, and as soon as it was removed, a fresh quantity of pus escaped, which had probably been shut in by the stone. As the operation had been performed only five days previously, the ultimate result could not be stated, although she was doing very well. The speaker referred to several other cases in which renal calculus had presented no diagnostic symptoms. In the previous history of this case there had been no such indications, and it was only three weeks before, after a fall, that the patient began to complain of pain in the affected side and general disturbance; the pyonephritic tumor was quite large and had probably existed for a long time previously as a hydronephrosis.—*N. Y. Surgical Society*, January 26, 1887.

**V. Suprapubic Cystotomy for Vesical Calculi and Extirpation of Hypertrophied Middle Lobe of the Prostate.** By FREDERICK LANGE, M.D. (New York). A man, æt. 60 years, had suffered very severely for several years, and cystotomy had been proposed six years previously, but refused. Opening the bladder, two calculi were found lodged in a deep diverticulum on the right side near the entrance of the urethra, one of them long and rounded like one of the irregular processes of a renal calculus which had been exhibited, so that the stone might possibly have descended from the kidney. Observing that the middle lobe of the prostate was considerably enlarged, the operator seized it with a volsella, encircled it with a galvano-caustic snare, and removed it without much difficulty, the hæmorrhage being slight. The wound in the bladder was kept open to allow of effective local treatment and, in spite of a severe intercurrent bronchitis, it was entirely healed at the end of two months, and the patient had lost the characteristic, anxious, nervous expression so common in those suffering from painful chronic affections of the bladder, and was able

to pass a full stream of urine instead of being obliged to use a catheter as he had done for years.—*N. Y. Surgical Society*. Jan. 26, 1887.

JAMES E. PILCHER (U. S. Army).

**VI. Extirpation of a Floating Kidney.** By Dr. G. KISPERT, (Madrid). Author reports following case: Patient, a woman, æt. 59 years; consulted him about six years ago. Menses when 18 years of age; married when 23; six children. Eleven years previously had experienced a fall from a mule, but health had been otherwise always good. Complained much of pains in the abdomen, especially on the right side, and extending downwards to the right thigh and upward toward the cardiac region. Careful and oft-repeated examination found a floating kidney on the right side, of normal size, the lower half lying below a horizontal line drawn through the umbilicus. Kidney movable in all directions, not tender on palpation. Urine normal, sometimes increased in quantity, sometimes less. A corset with hypogastric belt improved her condition somewhat at first. During the six years elapsed since then, the trouble increased, however, and during the past two years the pains became worse, a considerable increase in the size of the kidney being easily discernible. The latter became gradually also more tender on pressure, and sank further downwards. Her condition becoming finally so bad, an operation was deemed advisable. The question as to the most desirable mode of operating, by fixation of the capsule, or nephrectomy, was decided by the patient herself, who desired the removal of the kidney. The left kidney was ascertained to be in its normal position. Operation, Extirpation according to Simon's method, in April, 1886. Wound partly sutured and plugged with iodoform gauze. The subsequent course of the patient was highly satisfactory. No fever, pulse strong. Bowels moved on the seventh day, and patient was up and about on the thirty-fifth day. Amount of urine passed in 24 hours: First day, 675 ccm.; second day, 975 ccm.; third day, 945 ccm. The amount then varied between 800 and 1300 ccm. During the first two weeks the specific gravity was between 1012 and 1024. From the thirty-first to the ninetyeth day the specific gravity varied between 1003 and 1006 early in

the morning, and 1018 to 1022 at night. Urine was always acid; no albumen nor casts. The extirpated kidney was enlarged and showed cystic degeneration. Patient is well to-day, of healthy appearance; is completely free of pain and other distressing symptoms. In cases where the corset with hypogastric bandage does not afford the required relief, author considers fixation, according to Hahn's method, advisable.

Extirpation, however, is desirable if the kidney shows signs of degeneration and a pathological condition. In very difficult cases, König's retroperitoneal method, with or without intraperitoneal incision, will be advisable. The author appends a list of cases of floating organs which have come under his observation. Among 9,000 women these anomalies were found in 30 cases. As predisposing causes, he mentions loose abdominal walls, frequent confinements following each other at short intervals, heavy work, falling from a height, disturbance of digestion, and, in cases of dislocation of the spleen especially, preceding and frequent attacks of intermittent fever. The author's observations were confined entirely to the female sex in Spain. He reports 2 cases of floating liver, 12 cases of right floating kidney, 3 cases of left floating kidney, 1 case of double floating kidney, 1 case of left floating kidney together with floating spleen, and finally 11 cases of floating spleen alone. Among these latter, intermittent fever was present in 10 cases.—*Deutsch. Med. Wochenschrift*, No. 50, December 16, 1886.

C. J. COLLES (New York).















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